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ABSTRACT

This handbook outlines the scope of the Bureau of Labor Statistics programs and the methods it uses to collect, tabulate, evaluate, and publish a wide range of economic and statistical information from the studies and surveys that it conducts. These statistical programs are organized according to subject matter areas. The broad subject areas covered in this publication are current employment analysis, manpower structure and trends, prices and living conditions, wages and industrial relations, productivity and technology, occupational safety and health, and economic trends and labor conditions. Each chapter contains a list of technical references, and the appendix includes procedures for the seasonal factor method of analysis. (MF)

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BLS Handbook of Methods

for Surveys and Studies

BULLETIN 1711

U. S. DEPARTMENT OF LABOR
J.D. Hodgson, Secretary

BUREAU OF LABOR STATISTICS
Geoffrey H. Moore, Commissioner

1971

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Preface

The Bureau of Labor Statistics is essentially a factfinding agency, the functions of which are the collection, tabulation, evaluation, and publication of a wide range of economic and statistical information. A part of the BLS' responsibility is to make available to the users of its data information on the scope of its programs and the methods employed in the surveys and studies that it conducts.

The users of BLS information encompass a broad spectrum of the American society—administrators of businesses, large and small; workers; union officials; academicians; technicians; government policymakers and administrators at Federal, State, and local levels; and others of the general public.

The methods employed by the Bureau in collecting, analyzing, and presenting its data are often highly technical and complex. A description of these methods at a level of technical detail which would meet the requirements of all users might bore the technician or bewilder the nontechnical user.

The *Handbook of Methods* is designed to serve the broad middle range of users. The technician may wish to seek more detailed treatment of his field of interest, and the casual user may find simpler explanations more helpful. Sources of additional information, some more technical and some more popular, are listed under "Technical References" at the end of most chapters.

The chapters for the *Handbook* were prepared in the program offices of the Bureau and published by the Office of Publications, Division of Special Publications, under the direction of Tommy C. Ishee with the assistance of Scott Wirtzman.

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BLS Handbook of Methods for Surveys and Studies

Introduction

> The country is hungry for information; everything of a statistical character, or even of a statistical appearance is taken up with an eagerness that is almost pathetic; the community have not yet learned to be half skeptical and critical enough in respect to such statements.

With these words Gen. Francis A. Walker greeted Carroll Wright in 1873, as Dr. Wright assumed charge of the Massachusetts Bureau of Statistics and Labor. And when as U.S. Commissioner of Labor, he issued his first annual report in March 1886, Carroll Wright established the policy of explaining his statistical methods to his readers and of seeking to avoid misinterpretation of the figures presented. For example, he said:

> In stating the facts as they have been found by the agents of the Bureau, many terms are used which are capable of varied application—some even are of doubtful meaning when considered metaphysically, but all such terms are used in this report in their common acceptation; as, for instance, the term "overproduction" is used to indicate that condition of a locality, state, or country when more goods have been produced than are sufficient to meet the ordinary demand . . . .[1]

In the same report there are statements on testing the validity of figures (p. 141), problems of nonresponse (p. 90), and restrictions on coverage (headnotes to tables). Warnings as to inadequacies of available information occur frequently. During the 86 years which followed the initial report, the definitions, methods, and limitations of the data published by the Bureau of Labor and its successor, the Bureau of Labor Statistics, have been explained again and again. The reason for this is not merely to make the readers "skeptical," "critical," and aware of the known limitations of the statistics, but also to instruct them in the proper use of the information and to assure them that proper standards have been observed. Furthermore, whereas one might expect to breed a certain amount of doubt about a statistical survey by revealing its lack of perfection, frankness about unavoidable defects more often has the opposite effect, and public confidence in the work is reinforced in the process. The most grave doubts arise when things crying for explanation are not explained.

The Committee on Government Statistics and Information Services emphasized 30 years ago that the Central Statistical Board "should urge on each collecting agency the importance of publication by agencies of frank appraisals of the extent of noncomparability, incompleteness, and inaccuracy which may be inherent in their reports at any given time. This candid policy should enhance and not diminish the scientific prestige of the collecting agency."[2]

Full understanding of the statistical series and studies of the Bureau of Labor Statistics is not to be gained solely from detailed descriptions of them, but also from appraisal of the philosophy and approach of the Bureau and of the manner in which it functions.

Background

The history of the Federal Bureau of Labor extends back to 1884. Before the creation of the cabinet post of Secretary of Labor, the Bureau for a time was known as the Department of

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[1] See *Industrial Depressions, The First Annual Report of the Commissioner of Labor, March 1886*, pp. 15–16.

[2] Committee on Government Statistics and Information Services, *Government Statistics*, April 1937, p. 53. Recommendation #16 of the Committee states: "Continued criticism and analysis should be made of (a) statistical definitions, specifications, and classification; (b) coverage of supposedly complete surveys and of samples used for current reporting; (c) timing of periodic surveys and current reports, component items and weighting systems of index numbers; and (f) methods and practices in the presentation of data. . . . Frank appraisals of comparability, completeness, and accuracy should be published." (pp. 48–49).

Labor. From the Bureau's beginnings in the administration of President Arthur until it became a part of a cabinet department under President Wilson, it accumulated nearly 3 decades of experience in collecting, interpreting, and presenting facts crucial to the welfare of workers. Details of early Bureau history and of developments of later years are to be found elsewhere.[3] However, in describing the various statistical programs[4] in this volume, some of the events which led to the development of particular statistical measures are recounted. Against this historical background emerges the philosophy and posture of the Bureau of Labor Statistics as the impartial observer and interpreter of trends important to the welfare of workers. Voluntary reporting and the preserving of the confidential nature of reported data are important characteristics of BLS programs.

Voluntary Reporting and Confidentiality

In the 86-year history of the Bureau's operation it has asked hundreds of thousands of firms and individuals to provide information closely related to their daily affairs and their personal lives. To some of them who have supplied the desired information, the Bureau has gone back a second time, a third time, and perhaps dozens of times, for later information on the same subject or for new types of information. The response has been remarkable in its generosity, even when it is remembered that a sustained effort has been made to keep the requests reasonable. In no small measure, the cooperation received is due to the great care taken to avoid identifying the firm or the person supplying the information. The fact that Bureau employees pledge themselves to protect these data is less important than that they have a deep understanding of the adverse longrun consequences of even a single lapse. They are aware of the greater worth, in terms of pure statistical validity, of the information provided voluntarily as compared with that supplied under legal sanctions. The only inducement employed is to tell the respondent that his contribution is important to the ultimate success of the survey and that he may find the survey results useful in his own pursuits. The policy of not identifying the respondent is implemented by combining the data reported by the different sources and issuing the findings in summary form.

Another assurance given the respondent is that his report will be used for statistical purposes only. Attempts to "break" this policy, by organizations or individuals who wanted access to data in our possession and were willing to go to the courts to secure it, have been successfully resisted.[5] Another form this problem takes is the case in which an administrative agency of government seeks court action to compel a company to release its file copy of information provided in confidence to a statistical agency.[6]

While it cannot be proved that these policies result in more reliable statistics, Bureau Commissioners and their staffs over the years have been convinced from their experience that it is so. It is notable that some other Federal agencies (especially the Bureau of the Census), well-equipped with authority to compel the submittal of certain reports, rarely if ever invoke this power. Rather, they choose to rely upon forms of suasion similar to our own. The Bureau of Labor Statistics, while its functions as a statistical agency are prescribed by law,[7] has always relied upon voluntary cooperation of respondents in collecting information.

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[3] See, for example, the Secretary of Labor's *First Annual Report, 1913*, for history 1884-1913; and U.S. Department of Labor, *The Anvil and the Plow*, 1964; pages 4-5, 19-20, 49-51 (1913--30); pp. 63-64, 87-90, 117-119, 136-137, and 155 (1930-48); pp. 172-173, 187, 206-207, and 230-234 (1949-63).

[4] For a handy reference to BLS programs, showing their principal characteristics, see U.S. Department of Labor, Bureau of Labor Statistics, *Major BLS Programs* (issued annually).

[5] For example, see *Norweigan Nitrogen Company* v. *United States*, 288 U.S. 294; *United States* v. *Kohler*, 13 Fed. Rules Serv. 33.333 (E.D., Pa. 1949); *Hawes* v. *Walsh*, 277 Fed. 569, the Court of Appeals for the District of Columbia. In all of these cases, the courts sustained the policy of protecting the confidentiality of information given voluntarily and in confidence to an agency of the Federal Government.

[6] See Supreme Court of the United States, *St. Regis Paper Company, Petitioner*, v. *United States*, No. 47, October term, 1961.

[7] Excerpts from 29 U.S.C. 1, acts of June 27, 1884, ch. 127, 23 Stat. 60; June 13, 1888, ch. 389, § 1, 25 Stat. 182; Feb. 14, 1903, ch. 552, § 4, 32 Stat. 826; Mar. 18, 1904, ch. 716, 33 Stat. 136; Mar. 4, 1913, ch. 141, § 3, 37 Stat. 737.

BLS Role, Staff, and Organization

Among Federal agencies collecting and issuing statistics, the Bureau of Labor Statistics has been termed a "general-purpose statistical agency."[a] The Bureau's figures are prepared to serve the needs of business, labor, Congress, the general public, and especially the administrative and executive agencies, for information on economic and social trends and situations. While the data serve some administrative purposes, they are free from the constraints which sometimes result from the close ties normally existing between operations and operational statistics. BLS statistics are often quite specialized, yet they meet general economic and social data requirements. As the needs of users are likely to differ from each other and also over time, no statistic is ideal for all. This makes it important that the characteristics of the measures and their possible limitations be well understood.

The Bureau plays a larger and more significant role than merely publishing general-purpose statistics. Its activities frequently influence, and sometimes are crucial to, the determining and shaping of public policy. The Bureau's experts have the keen understanding of economic and social forces which results from intensive and continuous involvement in factfinding and in the painstaking analysis of data.

Staff

The Bureau's work extends beyond the initial collection and processing of data. Over the years, it has developed a staff of professional analysts, trained in the disciplines of economics and other social sciences, to search out the implications of survey findings for the welfare of workers and to present them as cogently and as promptly as possible in written and oral form. How successfully this can be accomplished depends greatly upon the competence of the analysts and of their supporting personnel.

In BLS, analytical and statistical work is performed by economists, statisticians, and mathematical-statisticians with the aid of an experienced corps of programers, systems analysts, and other professionals, as well as statistical clerks. For analytical work, economists at even the lowest grade level must meet Civil Service Commission requirements roughly equivalent to a college major in economics. There are comparable requirements for other professionals. The greatest effort is made to locate the best of graduating seniors, Masters, Ph.D.'s, and those with research experience, in the colleges, State agencies, business organizations, and labor unions. The Bureau provides training needed for on-the-job skills, as background to special assignments, to keep professionals abreast of changes in their fields, and to aid higher level and executive professionals in obtaining the best results from their staffs.

In training staff, a special effort is made to impart detailed knowledge of the techniques used in collecting and compiling the statistics, so that maximum application of data results to current problems can be made without a risk of exceeding the limits of their significance.

Organization

The statistical programs of the Bureau were developed, for the most part, independently of each other, taking on characteristics suited to the requirements of the subject under observation. As a result, the Bureau was organized according to subject-matter areas, an arrangement which has proved efficient and has been continued over the years. Expertise in techniques, economic analysis, and other staff activities across subject-matter lines were added to provide better utilization of the Bureau's resources.

As the Bureau's collection activities increased, regional offices were established in 1943 to provide administration of the field programs and staff. Another function of the offices was to disseminate data to local users and to furnish technical advice and assistance to State agencies and other cooperating organizations. An important aspect of the work of the regional staffs has been the function of explaining the concepts and techniques which we utilize in compiling our statistics.

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[a] Bureau of the Budget, *Statistical Services of the United States Government* (revised edition), 1963, p. 7.

Special recognition of the competence of the Bureau in the field of statistics was given by the Secretary of Labor in 1955 when he delegated to the Commissioner of Labor Statistics the responsibility for continuously reviewing all of the statistical programs of the Department of Labor and of making recommendations for their improvement.

Consultation and Advice on Statistical Programs

A statistical program too much detached from the uses of its data may fail in its principal mission. To avoid sterility and stagnation, the Bureau continuously invites advice and ideas from users and experts in business, labor, and academic organizations and individual members of the public. Over the years, the advice the Commissioner of Labor Statistics has received on policy and technical matters from responsible parties, relating to the collection and analysis of our statistics, has usually been sound and therefore very helpful. Of course, decisions on statistical policy have always been the final responsibility of the Commissioner.

In order to keep in touch with the current and anticipated needs of business and labor groups and to seek advice on technical problems, the Commissioner first established standing research advisory committees in 1947. These groups, now called the Business Research Advisory Council and the Labor Research Advisory Council, serve in an advisory capacity with respect to technical problems, consult on Bureau programs, and provide perspectives on Bureau programs in relation to needs of their members. The councils accomplish their work in general sessions and also through committees designated to subject-matter fields on a more specialized basis. Committee memberships are augmented by other persons in industry or labor who have special competence although not council members. The councils may take formal action through resolutions or recommendations on matters regarded as appropriate for such action, but such resolutions are merely advisory. Members of the councils and the subcommittees serve in their individual capacities, not as representatives of their organizations.

The members of the Labor Research Advisory Council are designated by the Commissioner of Labor Statistics under authorization by the Secretary of Labor, from nominations by the Director of Research, AFL–CIO. All research directors of international unions represented in the AFL–CIO, the Railway Labor Executives' Association, and the railroad operating unions are invited to attend the general meetings of the council. The council provides general direction to the advisory activities of trade union research directors in relation to the Bureau.

The members of the Business Research Advisory Council are designated by the Commissioner under authorization of the Secretary of Labor, after consultation with the National Association of Manufacturers, the U.S. Chamber of Commerce, and other organizations broadly representative of American business. Members serve in their individual capacities, not as representatives of their companies.

The Bureau often seeks the advice of professional economists, statisticians, social scientists, educators, and others, either in their individual capacities or as members of professional organizations. This is most likely to occur when a conceptual or theoretical question arises which is considered fundamental to the work of the Bureau in a specialized field, and where professional acceptance of the Bureau's work in that field may be reinforced by the findings of an independent analyst.

It is a fundamental objective of the Bureau that its statistical practice be built soundly upon established statistical theory. The objective can be realized only if BLS practitioners are trained in statistics and if they keep their knowledge up to date. For this reason the Bureau encourages their participation in activities of the professional societies, their efforts to improve their education in statistics, and continuing contacts with other experts in their disciplines. The efforts of other statistical organizations, public and private, are studied unremittingly so that BLS may reap benefits from the experiences of others.

Standard Definitions

Where related statistics cut across program lines or across Government bureaus, the Bureau of Labor Statistics cooperates to the maximum extent possible in the Office of Management and Budget's (formerly, the Bureau of the Budget) effort to obtain adherence to standard definitions of terms for maximum comparability. The use of the definition of establishment is a case in point.

The business establishment has been found to be the most satisfactory source of data for most industrial statistics because it is the first level of business organization for which complete records—i.e., production, employment, purchases, sales, wages, inventories, etc.— are generally maintained. The establishment is the primary unit of organization in the business economy and is the first integrated level or combination of employees devoted to the production of a related group of products or services. In BLS programs in which it is applicable, the standardized definition of the establishment is utilized.[9]

The Bureau also follows the Office of Management and Budget's definition of "production and related workers," [10] and uses the "standard payroll period." [11] The reader is referred to appendixes B and C for descriptions of the standards followed with respect to industrial classification and geographic classification.

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[9] See appendix B.

[10] *Standard Definitions of Types of Workers*, Bureau of the Budget, November 7, 1944. "Production and related workers are defined to include working foremen and all nonsupervisory workers (including leadmen and trainees) engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, packing, warehousing, shipping, maintenance, repair, janitorial, watchman services, product development, auxiliary production for plant's own use (e.g., powerplant) and record-keeping and other services closely associated with the above production operations. Excluded are supervisory employees (above the working foremen level) and their clerical staffs."

[11] *Standard Definition of Payroll Periods for Employment Reports*, Bureau of the Budget, March 28, 1952. "In order to maintain a coordinated system of employment reports and to reduce the reporting burden on respondents, requests made to employing establishments for statistical information from their payroll records on the number of employees, payrolls, hours worked, or related items, should refer to the payroll period containing the 12th of the month."

Current Employment Analysis

Chapter 1. Labor Force, Employment, and Unemployment

Background

Each month, the Bureau analyzes and publishes statistics on the labor force, featuring information on employment, unemployment, and nonparticipation, classified by a variety of demographic, social, and economic characteristics. These statistics are derived from the Current Population Survey, (CPS), which is conducted by the Bureau of the Census. The survey is based on a probability sample of households, representative of the civilian noninstitutional population of the United States.

Concepts of the labor force, employment, and unemployment were introduced in the latter stages of the depression of the 1930's, chiefly to arrive at more objective measurements of unemployment and employment than were previously available. Before the 1930's, aside from attempts in some of the decennial censuses, no direct measurements were made of the number of jobless persons. The development of mass unemployment in the early 1930's increased the need for statistics, and widely conflicting estimates based on a variety of indirect techniques began to appear. Dissatisfied with these methods, many research groups, as well as State and municipal governments, began experimenting with direct surveys of the population or samples of the population. In these surveys, an attempt was made to classify the population as employed, unemployed, or out of the labor force, by means of a series of questions addressed to each individual. In most of the surveys, the unemployed were defined as those who were not working but were "willing and able to work." This concept, however, did not meet the standards of objectivity that many technicians felt were necessary to measure either the level of unemployment at a point in time or changes over periods of time. The criterion "willing and able to work," when applied in specific situations, appeared to be too intangible and too dependent upon the interpretation and attitude of the persons being interviewed.

Out of this experimentation, a set of concepts was developed in the late 1930's which sought to meet these various criticisms. According to the new concepts, the classification of an individual depends principally on his actual activity within a designated time period, i.e., was he working, looking for work, or engaged in other activities? These concepts were adopted for the national sample survey of households initiated by the Works Progress Administration (WPA) in 1940.

Originally termed the Monthly Report on Unemployment when the WPA was responsible for the collection of labor force statistics, the household survey was transferred to the Bureau of the Census late in 1943. Its name was changed at that time to the Monthly Report on the Labor Force (MRLF). The survey title was changed once more—in 1948—to the present "Current Population Survey" in order to reflect more accurately its expanding role as a source for a wide variety of demographic and economic characteristics of the population. In 1959, responsibility for analyzing and publishing the CPS labor force data was transferred to the BLS, although the Census Bureau has continued to collect and tabulate the statistics.

Description of Survey

The CPS provides statistics on the civilian noninstitutional population 16 years of age and over. Figures on the Armed Forces (obtained monthly from the Department of Defense) are added to the CPS estimates to derive estimates of the total labor force and the total nonin-

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stitutional population. Persons under 16 years of age are excluded from coverage in the survey because child labor laws, compulsory school attendance, and general social custom prevent most of these children in the United States from working. The institutional population, which is excluded from coverage, consists of inmates of penal and mental institutions, tuberculosis sanitariums, and homes for the aged, infirm, and needy.[1]

The CPS is collected each month from a probability sample of approximately 47,000 households. Participation in the survey is on a purely voluntary basis. Respondents are assured that all information obtained is completely confidential and is used only for the purpose of estimating national totals.

The time period covered in the monthly survey is a calendar week. A calendar week was selected as the survey reference period because the period used must be short enough so that the data obtained is "current" and the time reference not so short that the occurrence of holidays or other accidental events causes extremely erratic fluctuations in the information obtained. A calendar week fulfills these conditions as well as being a convenient and easily defined period of time. Since July 1955 the week containing the 12th day of the month has been used. The actual survey is conducted during the following week, which is the week containing the 19th day of the month.

Concepts

The criteria used in classifying persons on the basis of their labor force activity are as follows:

Employment. Employed persons comprise (1) all those who, during the survey week, did any work at all as paid employees, or in their own business, profession, or farm, or who worked at least 15 hours as unpaid workers in a family-operated enterprise and (2) all those who were not working but who had jobs or businesses from which they were temporarily absent because of illness, bad weather, vacation, labor-management dispute, or various personal reasons. Each employed person is counted only once. Those who held more than one job are counted in the job at which they worked the greatest number of hours during the survey week. Excluded from the employed group are persons whose only activity consisted of work around their own home (such as housework, painting, repairing, etc.) or volunteer work for religious, charitable, and similar organizations.

Unemployment. Unemployed persons include those who did not work at all during the survey week, were looking for work, and were available for work in the reference period. Those who had made efforts to find work within the preceding 4-week period—such as by registering at a public or private employment agency, writing letters of application, canvassing for work, etc.—and who, during the survey week, were awaiting the results of these efforts, are considered to be looking for work. Also included as unemployed are those who did not work at all during the survey week and (a) were waiting to be called back to a job from which they had been laid off, (b) were waiting to report to a new wage or salary job scheduled to start within the following 30 days (and were not in school during the survey week), or (c) would have been looking for work except that they were temporarily ill.

Duration of unemployment represents the length of time (through the current survey week) during which persons classified as unemployed had been continuously looking for work. For persons on layoff, duration of unemployment represents the number of full weeks since the termination of their most recent employment. A period of 2 weeks or more during which a person was employed or ceased looking for work is considered to break the continuity of the present period of seeking work. Average duration is an arithmetic mean computed from a distribution by single weeks of unemployment.

Labor Force. The civilian labor force comprises the total of all civilians classified as employed and unemployed. The total labor force includes members of the Armed Forces stationed either in the United States or abroad.

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[1] For a fuller explanation of the Current Population Survey, see *Concepts and Methods Used in Manpower Statistics from the Current Population Survey*, U.S. Department of Commerce and U.S. Department of Labor (1967), Report 313.

Not in Labor Force. All civilians who are not classified as employed, unemployed, or in the Armed Forces are defined as "not in the labor force." These persons are further classified as "engaged in own housework," "in school," "unable to work" because of long-term physical or mental illness, and "other." The "other" group includes retired persons, individuals reported as too old or temporarily unable to work and the voluntarily idle. It also includes seasonal workers for whom the survey week fell in an "off" season and who were not reported as looking for work and persons who did not look for work because they believed either that no jobs were available in the area or that no jobs were available for which they could qualify. Persons doing only incidental unpaid family work (less than 15 hours in the specified week) also are classified as not in the labor force.

The category "not in labor force—in school" includes persons attending school during the survey week who had new jobs to which they were scheduled to report within 30 days. All persons—whether or not attending school—who had new jobs not scheduled to begin until after 30 days (and who were not working or looking for work) are classified as not in the labor force.

For persons not in the labor force, questions are asked about previous work experience, intentions to seek work, desire for a job at the time of interview, and reasons for not looking for work. The questions for persons not in the labor force are asked only in those households that are new entrants to the sample and in those that are reentering the sample after 8 months' absence. (See Sampling.)

Sampling

The Survey Design

The CPS sample is located in 461 sample areas comprising 923 counties and independent cities with coverage in every State and the District of Columbia. In all, about 55,000 housing units and other living quarters are designated for the sample at any time, of which about 47,000, containing about 105,000 persons 16 years and over, are occupied by households eligible for interview. The remainder are units that are vacant, converted to nonresidential use, containing persons who reside elsewhere, or ineligible for other reasons. Of the occupied units eligible for enumeration, about 3 to 5 percent are not interviewed in a given month because the residents are not found at home after repeated calls, are temporarily absent or are unavailable for other reasons.[2]

Selection of Sample Areas. The entire area of the United States consisting of 3,000 counties and independent cities is divided into 1,931 primary sampling units. With some minor exceptions, a primary sampling unit (PSU) consists of a county or a number of contiguous counties. Each of the 237 standard metropolitan statistical areas (SMSA's)[3] in existence at the time of the 1970 Census constitutes a separate PSU. By combining counties to form PSU's, greater heterogeneity is accomplished. Moreover, another important consideration is to have the PSU sufficiently compact in area so that, with a small sample spread throughout, it can be canvassed efficiently without undue travel cost. A typical primary sampling unit, for example, includes both urban and rural residents of both high and low economic levels and encompasses, to the extent feasible, diverse occupations and industries.

The PSU's are grouped into 461 strata. Among these PSU's, 146 of the largest SMSA's (including all having over 250,000 inhabitants) and 10 other areas (not SMSA's) are separate strata representing themselves. In general, however, a stratum consists of a set of PSU's as much alike as possible in various characteristics such as geography, population density, rate of growth in the 1960–70 decade, proportion of Negroes and other minority races, principal industry, and type of agriculture.

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[2] For a more detailed description of the sample design and other technical phases of the CPS program, see U.S. Department of Commerce, Bureau of the Census, *Technical Paper No. 7,* "The Current Population Survey—A Report on Methodology," (1963).

[3] See appendix C.

Except for the 156 areas mentioned, each of which is a complete stratum, the strata are established so that their sizes in terms of 1970 population are approximately equal. From each stratum a single PSU is selected to represent the entire stratum. In the 156 strata in which there is only a single PSU (the 146 SMSA's and 10 special cases), the single PSU automatically falls in the sample. When the stratum has more than one PSU, the sample PSU is selected in a random manner in such a way that its probability of selection is proportionate to its 1970 population. For example, within a stratum the chance that a PSU having a population of 50,000 would be selected is twice that for a unit having a population of 25,000.

Selection of Sample Households. The sample design calls for a sampling ratio which depends on the predetermined total sample size. For 1971–73, it is 1 household for every 1,300 households in each stratum. The sampling ratio is modified slightly by month, as the size of the sample is held relatively constant despite the overall growth of the population. The sampling ratio used within each sample PSU depends on the proportion that the population of the sample area was of the stratum population at the time of the 1970 Census. In a sample area which was one-tenth of the stratum, the within-PSU sampling ratio that results is 1 in 130.0 thereby achieving the desired ratio of 1 in 1,300 for the stratum. For each PSU that is a stratum representing only itself, the sampling ratio is 1 in 1,300 regardless of the size of the PSU.

With each of the 461 sample PSU's, the number of households to be enumerated each month is determined by the application of the within-PSU sampling ratio rather than through the assignment of a fixed quota. This procedure makes it possible to reflect, on a current basis, population changes within the sample area. Consequently, the sample as a whole properly reflects the changing distribution of the population and avoids the distortion which would result from the application of fixed quotas of households or persons based on the population at an earlier date.

Within each designated PSU, several stages of sampling may be used in selecting the units to be enumerated. The first step is the selection of a sample of census enumeration districts (ED's), which are administrative units used in the 1970 Census and contain, on the average, about 250 households. These are selected systematically from a geographically arranged listing, so that the sample ED's are spread over the entire PSU. The probability of selection of any one ED is proportionate to its 1970 population.

The next step is to select a cluster of approximately 4 households to be enumerated within each designated ED. This selection is made wherever possible, from the list of addresses for the ED compiled during the 1970 Census or, if the addresses are incomplete or inadequate, by area sampling methods. The address lists are used in about two-thirds of the cases, primarily in urban areas, and area sampling is applied in the remainder. An effort is made to have all units at one single address included within the same segment. This makes it relatively easy for the interviewer to cover all units designated for the sample.

The list sample is supplemented by a selection of the appropriate proportion of units newly constructed in the PSU since the Census date. The addresses of these units are obtained mainly from records of building permits maintained by the offices responsible for issuing permits in that area. A special procedure for updating parts of the census lists also is followed to reflect either units missed in the Census or new construction in areas where there is no adequate system of building permits. In those enumeration districts where area sampling methods are used—mainly rural areas—the ED's are subdivided into segments, that is, small land areas having well-defined boundaries and in general an expected "size" of about 12 housing units or other living quarters. For each subdivided enumeration district, one segment is designated for the sample; the probability of selection is proportionate to the estimated "size" of the segment. An interviewer does not conduct interviews at all housing units in the segment, however; she is instead given a sampling pattern so that, in general, one-third of the units are enumerated. The remaining housing units in the segment are then available for future samples.

Rotation of Sample. Part of the sample is changed each month. A primary reason for rotating the sample is to avoid the problems of uncooperativeness which arise when a constant panel is interviewed indefinitely. Another reason for replacing households is to reduce the cumulative effect of biases in response that sometimes occur when the same persons are interviewed indefinitely. To accomplish this rotation of the sample on a gradual basis, maps and other materials for several samples are prepared simultaneously. For each sample, eight systematic subsamples (rotation groups) of segments are identified. A given rotation group is interviewed for a total of 8 months, divided into two equal periods. It is in the sample for 4 consecutive months one year, leaves the sample during the following 8 months, and then returns for the same 4 calendar months of the next year. In any 1 month, one-eighth of the sample segments are in their first month of enumeration, another eighth are in their second month, and so on; the last eighth are in for the eighth time, the fourth month of the second period of enumeration. Under this system, 75 percent of the sample segments are common from month to month and 50 percent from year to year. This procedure provides a substantial amount of month-to-month and year-to-year overlap in the panel, thus reducing discontinuities in the series of data, without burdening any specific group of households with an unduly long period of inquiry.

Collection Methods

Each month, during the calendar week containing the 19th day, interviewers contact some responsible person in each of the sample households in the CPS. At the time of the first enumeration of a household, the interviewer prepares a roster of the household members, including their personal characteristics (date of birth, sex, race, marital status, educational attainment, veteran status, etc.) and their relationship to the household head. This roster is brought up to date at each subsequent interview to take account of new or departed residents, changes in marital status, and similar items. The information on personal characteristics thus is available each month for identification purposes and for cross-classification with economic characteristics of the sample population.

At each monthly visit, a questionnaire is completed for each household member 16 years of age and over. The interviewer asks a series of standard questions on economic activity during the preceding week, the calendar week containing the 12th day of the month, called the "survey week." The primary purpose of these questions is to classify the sample population into the three basic economic groups—the employed, the unemployed, and those not in the labor force.

Additional questions are asked each month to help clarify the information on employment status. For the employed, information is obtained on hours worked during the survey week, together with a description of the current job. For those temporarily away from their jobs, the enumerator records their reason for not working during the survey week, whether or not they were paid for their time off, and whether they usually work full or part time. For the unemployed, he records (1) methods used to find work, (2) the reason the unemployed persons had started to look for work, (3) the length of time they had been looking for work, (4) whether they were seeking full- or part-time work, and (5) a description of their last full-time civilian job. For those outside the labor force, their principal activity during the survey week—whether keeping house, going to school, or doing something else—is recorded. In addition, for all households in the incoming or returning rotation group, questions on the work history, reasons for nonparticipation, and job seeking intentions of individuals not in the labor force are asked.

The questionnaires containing the information obtained for each person in the sample are subjected to a field edit by clerks in each of the 12 regional offices of the Census Bureau. The field edit serves to catch omissions, inconsistencies, illegible entries, and errors at the point where correction is still possible. Many of the error corrections made in the field edit prevent delays in further processing of the questionnaires in Washington.

After the field edit, the questionnaires are forwarded to the Washington office of the Census Bureau. All of the questionnaires are received in Washington by the end of the week after enumeration. The raw data are transferred to computer tape and checked for completeness and consistency.

The interviewers on the CPS are chiefly part-time workers, although most of the staff at any time consists of persons who have had several years experience on the survey. They are given intensive training when first recruited and have either direct or home study training each month, before the survey. Moreover, through editing of their completed questionnaires, repeated observation during enumeration, and a systematic reinterview of part of their assignments by the field supervisory staff, the work of the interviewers is kept under control and errors or deficiencies are brought directly to their attention.

Estimating Methods

To increase the reliability of the labor force statistics derived from the sample, the estimation procedure uses two stages of ratio estimates and a "composite estimate". Achievement of this rather complicated procedure is made rapidly and automatically because of the availability of high-speed electronic digital computers. The principal steps involved are as follows.

Adjustment for Households Not Interviewed. The weights for all households interviewed are adjusted to the extent needed to account for units occupied by persons eligible for interview but for which no interview was obtained because of absence, impassable roads, refusals, or other reasons. This adjustment is made separately by groups of PSU's and, within these, for each color (white or Negro and other races) and residence group of households (urban, rural nonfarm, rural farm). The adjustment is made separately within each pair of rotation groups (the incoming pair, the two continuing pairs, and the outgoing pair).

Ratio Estimates. The distribution of the population selected for the sample may differ somewhat, by chance, from that of the Nation as a whole in such basic characteristics as age, color, sex, and farm-nonfarm residence, among other things. These particular population characteristics are correlated closely with labor force participation and other principal measurements made from the sample. Therefore, some of the sample estimates can be improved substantially when, by appropriate weighting of the original returns, the sample population is brought as closely into agreement as possible with the known distribution of these characteristics in the entire population. Such weighting is accomplished through two stages of ratio estimates:

1. *First stage.* The first stage of ratio estimates takes into account differences in the distribution by color and residence of the population estimates from the sample PSU's and that of the total population in each of the four major regions of the country. However, independent distributions of the total population by residence, cross-classified by color, are not available on a current basis. Therefore, using 1970 Census data, estimated population totals by color and residence for a given region are computed from population counts for PSU's in the CPS sample. Ratios then are computed between these estimates (based on sample PSU's) and the actual population totals for the region as shown by the 1970 Census. In deriving these ratios, PSU's that made up entire strata and were selected with certainty (usually referred to as "self-representing" PSU's) are excluded from the computations, since they represent only themselves. In tabulations of the monthly results from the CPS, the weights for all sample households from non-self-representing PSU's in a given region are

multiplied by the population ratio for that region for the appropriate color-residence group.

2. *Second stage.* The second stage of ratio estimates takes account of current differences between the population distributions of the sample and that of the Nation as a whole by age, color, and sex. Independent estimates of the entire population, by these characteristics, are prepared each month. They are calculated by carrying forward the most recent census data (1970) to take account of subsequent aging of the population, mortality, and migration between the United States and other countries. The CPS sample returns (taking into account the weights determined after the first stage of ratio estimates) in effect are used to determine only the distribution within a given age-color-sex group by employment status and various other characteristics. In developing statistics, these sample distributions are multiplied by the ratio of the independent population estimate to the sample estimate for the appropriate age-color-sex group.

Composite Estimate. The last step in the preparation of estimates makes use of a composite estimate. In this procedure, a weighted average of two estimates is obtained for the current month for any particular item. The first estimate is the result of the two stages of ratio estimates described above. The second estimate consists of the composite estimate for the preceding month to which has been added an estimate of the change in each item between the preceding month and the present month, based upon that part of the sample which is common to both months (75 percent). Although the weights for the two components of such a composite estimate do not necessarily have to be equal, in this instance the weights used for combining these two estimates are each one-half. Equal weights in this case satisfy the condition that for virtually all items there will be some gain in reliability over the estimation procedure after the first two stages of ratio estimates.

The composite estimate results in a reduction in the sampling error beyond that which is achieved after the two stages of ratio estimates described; for some items the reduction is substantial. The resultant gains in reliability are greatest in estimates of month-to-month change, although gains also are obtained for estimates of level in a given month, change from year to year, or change over other intervals of time.

Presentation and Uses

The CPS provides a large amount of detail on the economic and social characteristics of the population of the United States. It is the source of monthly estimates of total employment, both farm and nonfarm; of nonfarm self-employed persons, domestics, and unpaid helpers in nonfarm family enterprises; and of total unemployment, whether or not covered by unemployment insurance. It is a comprehensive source of information on the personal characteristics such as age, sex, race, educational attainment, and marital status of the total labor force and of the employed, the unemployed, and those not in the labor force.

It provides distributions of workers by the numbers of hours worked, as distinguished from aggregate or average hours for an industry, permitting separate analyses of part-time workers, workers on overtime, etc. The survey is a comprehensive current source of information on the occupation of workers, whether teachers, stenographers, carpenters, laborers, etc. It also provides limited statistics on the industries in which they work.

Information is available from the survey not only for persons in the current labor force but also for those who are outside the labor force, some of whom may be considered to be a "labor reserve." The characteristics of such persons —whether married women with or without young children, disabled persons, students, older retired workers, etc.—can be determined. Also, through special inquiries, it is possible to obtain information on their skills and past work experience, if any.

Each month, a significant amount of basic information about the labor force is analyzed and published in *Employment and Earnings.* The tables in this report provide information on the labor force, employment, and unemployment by a number of characteristics, such as age, sex, color, marital status, industry, and occupation. Approximately 150 of the most important estimates from the CPS are presented each month on a seasonally adjusted basis. These estimates are adjusted by the BLS Seasonal Factor Method, which is described in the appendix on seasonal adjustment.

The CPS is used also for a program of special inquiries to obtain detailed information from particular segments, or for particular characteristics of the population and labor force. Approximately 8 to 10 such special surveys are made each year. The inquiries are repeated annually in the same month for some topics, including the earnings and total incomes of individuals and families (published by the Census Bureau), the extent of work experience of the population during the calendar year, the extent of overtime work at premium pay, usual weekly earnings of wage and salary workers, and the prevalence of multiple jobholding. They also include marital and family characteristics of workers, the employment of school-age youth, the employment of recent high school graduates, the educational attainment of workers, and the employment situation in poverty areas of our major cities. Surveys have been made periodically on subjects such as job mobility, and length of time on current job. In addition, surveys are published in very great detail on the characteristics of the unemployed and persons not in the labor force.

Generally, the persons who provide information for the monthly CPS questions also answer the supplemental questions. Occasionally, the kind of information sought in the special survey requires the respondent to be the person about whom the questions are asked.

Information obtained through the supplemental questions is combined with data in the regular schedule to provide tabulations of all the desired personal and economic characteristics of the persons in the special survey. Reports on these special surveys are first published in the *Monthly Labor Review*. Reprints of the articles, together with technical notes and additional tables, are published as *Special Labor Force Reports*.

Limitations

Geographic. The CPS is designed to produce reliable National estimates. It is not designed to produce estimates for States and areas. A sample which could produce State estimates as reliable as those now published for the Nation would have to be approximately fifty times as large as the present sample.

Sources of Errors in the Survey Estimates. The estimates from the survey are subject to sampling errors, that is, errors arising from the fact that the estimates each month are based on information from a sample rather than the whole population. In addition, as in any survey work, the results are subject to errors made in the field and to errors that occur in the process of compilation.

Classification errors in labor force surveys may be particularly large in the case of persons with marginal attachments to the labor force. These errors may be caused by interviewers, respondents, or both, or may arise from faulty questionnaire design. In spite of a continuous quality control program, interviewers may not always ask the questions in the prescribed fashion. To the extent that varying the wording of the question causes differences in response, errors or lack of uniformity in the statistics may result. Similarly, the data are limited by the adequacy of the information possessed by the respondent and the willingness to report accurately.

The estimates from the survey are subject to various other types of errors beyond those already mentioned. Some of these are:

1. *Nonresponse.* About 3 to 5 percent of occupied units are not interviewed in a typical month because of temporary absence of the occupants, refusals to cooperate, or various other reasons. Although an adjustment is made in weights for interviewed households to account for noninterviews, they still represent a possible source of bias. Similarly, for a relatively few households, some of the information is omitted because of lack of knowledge on the part of the respondent or because the interviewer forgot to ask certain questions or record the answers. In processing the completed ques-

tionnaires, entries usually are supplied for omitted items on the basis of the distribution in these items for persons of similar characteristics.

2. *Independent Population Estimates.* The independent population estimates used in the estimation procedure may also provide a source of error, although on balance their use substantially improves the statistical reliability of many of the important figures. (See discussion under "Ratio Estimates," p. 12.) Errors may arise in the independent population estimates because of underenumeration of certain population groups or errors in age reporting in the last census (which serves as the base for the estimates) or similar problems in the components of population change (mortality, immigration, etc.) since that date.

3. *Processing errors.* Although there is a quality control program on coding and a close control on all other phases of processing and tabulation of the returns, some processing errors are almost inevitable in a substantial statistical operation of this type. However, the net error arising from processing is probably fairly negligible.

Measuring the Accuracy of Results. Modern sampling theory provides methods for estimating the range of errors due to sampling where, as in the case of the CPS sample, the probability of selection of each member of the population is known. Methods also are available for determining the effect of response variability in the CPS. A measure of sampling variability indicates the range of difference that may be expected because only a sample of the population is surveyed. A measure of response variability indicates the range of difference that may be expected as a result of compensating types of errors arising from practices of different interviewers and the replies of respondents; these would tend to cancel out in an enumeration of a large enough population. In practice, these two sources of error—sampling and response variability, as defined above—are estimated jointly from the results of the survey. The computations, however, do not, incorporate the effect of response bias, that is, any systematic errors of response—for example, those that would occur if, by and large, respondents tended to overstate hours worked. Response biases occur in the same way in a complete census as in a sample, and, in fact, they may be smaller in a well-conducted sample survey because for the relatively small sample it is feasible to pay the price necessary to collect the information more skillfully.

Estimates of sampling and response variability combined are provided in *Employment and Earnings* and in other reports based on CPS data, thus permitting the user to take this factor into account in interpreting the data. In general, the smaller figures and small differences between figures are subject to relatively large variation and should be interpreted with caution. The availability of the high-speed electronic computer makes possible considerably more detailed estimates than were possible earlier.

Estimation of response bias is one of the most difficult aspects of survey and census work. Systematic studies on this subject are now an integral part of the CPS,[4] but in many instances available techniques are not sufficiently precise to provide satisfactory estimates of response biases. Considerable experimentation is in progress with the aim of developing more precise measurements and improving the overall accuracy of the series.

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[4] For a summary of these studies, see Bureau of the Census, *Technical Paper No. 6*, "The Current Population Survey Reinterview Program—Some Notes and Discussion" (March 1963).

Technical References

Number

1. President's Committee to Appraise Employment and Unemployment Statistics, *Measuring Employment and Unemployment* (1962).

A review of all Federal statistical series on employment and unemployment and a comparison of the sources and uses of each series. The discussion of labor force statistics includes a brief history of their development, an evaluation of current concepts and techniques, and rec-

ommendations for further research and improvements, several of which were inaugurated in January 1967.

2. U.S. Department of Commerce, Bureau of the Census, *Technical Paper No. 6*, "The Current Population Survey Reinterview Program—Some Notes and Discussion" (1963).

   A summary of procedures and results of the Current Population Survey Reinterview Program from 1955 through 1961 and some interpretations and comparative results from other studies.

3. U.S. Department of Commerce, Bureau of the Census, *Technical Paper No. 7*, "The Current Population Survey—A Report on Methodology" (1963).

   A brief history of the Current Population Survey (CPS) from its inception (1943) to the present. A detailed description is given for both the sample design and survey procedures. Also included is a detailed discussion of the various modifications in design and procedures and the resultant gain in precision.

4. U.S. Department of Labor, Bureau of Labor Statistics and U.S. Department of Commerce, Bureau of the Census, *Concepts and Methods Used in Manpower Statistics from the Current Population Survey*, BLS Report 313 and Current Population Reports, Series P–23, No. 22 (1967).

   A concise description of the methodology in obtaining labor force information from sample households. Labor force concepts and definitions are set forth. The adequacy of labor force data and quality controls are discussed, and major improvements in the Current Population Survey are listed chronologically.

5. U.S. Department of Labor, Bureau of Labor Statistics, *How the Government Measures Unemployment*, Report 312 (1967).

   A short nontechnical discussion of the concepts and methods used in obtaining labor force statistics from the Current Population Survey.

—JOHN E. BREGGER

Chapter 2. Employment, Hours, and Earnings

Background

The first monthly studies of employment and payrolls by the Bureau of Labor Statistics (BLS) began in October 1915 and covered four manufacturing industries. Before that year, the principal sources of employment data in the United States were the census surveys—the decennial Census of Population, and beginning in 1899, the quinquennial Census of Manufactures. No regular employment data had been compiled between the Census dates.

By November 1916, the BLS program had been expanded to cover 13 manufacturing industries, and this number remained unchanged until 1922. The depression of 1921 directed attention to the importance of current employment statistics, and in 1922 Congress granted additional funds to provide for program expansion. By June 1923, the number of manufacturing industries covered by the monthly employment survey had increased to 52. In 1928, concern over increasing unemployment induced Congress to provide additional appropriations for the program. In the next 4 years, 38 manufacturing and 15 nonmanufacturing industries were added to the list of industries for which the Bureau published monthly information on employment and payrolls.

The onset of the Great Depression in 1930 and the deepening economic crisis impelled President Hoover to appoint an Advisory Committee on Employment Statistics to study the need for expanded data in this field. The Committee made its report in the spring of 1931 with a number of recommendations for extension of the program. The most important of these called for the development of series on hours and earnings. For the fiscal year 1932, Congress granted the Bureau a substantial increase in the appropriation for the program. In January 1933, average hourly earnings and average weekly hours for the first time were published for all manufacturing, for 90 manufacturing industries, and for 14 nonmanufacturing categories.

During the Great Depression when mass unemployment threatened to become a continuing aspect of American life, there was much controversy among various authorities concerning the actual number of the unemployed. These discussions pointed up the fact that no reliable measures of either unemployment or employment existed. In the early years of the Roosevelt administration, the Secretary of Labor frequently referred to the value of the Bureau's employment estimates as an indirect measure of unemployment. This interest stimulated efforts to develop comprehensive estimates of total wage-and-salary employment in nonagricultural industries, and in 1936, the Bureau first published such a figure.

The preparation of these estimates of overall employment totals on a monthly basis was contingent on the development of benchmark data. It was recognized, even in the 1920's, that month-to-month employment trends derived from a sample of establishments might be fairly accurate for short periods, but over long intervals of time the series would not represent the true movement of employment, unless they were adjusted periodically to reasonably complete counts of employment, called benchmarks. The first such adjustment was made in 1935, when the Bureau's employment series in manufacturing were adjusted to totals from the Census of Manufactures for 1923, 1925, 1927, 1929, and 1931. These series were subsequently adjusted to the successive biennial Censuses of Manufacturers, through that of 1939. For nonmanufacturing industries, benchmarks were developed from various sources, including the Censuses of Business taken at intervals from 1929 on.

From 1915 to the beginning of World War II, interest in employment statistics for States and areas was growing constantly. Even before the Bureau of Labor Statistics entered the field in

1915, three States (Massachusetts, New York, and New Jersey) were preparing employment statistics. As early as 1915, New York and Wisconsin had entered into "co-operative" agreements with the Bureau, whereby sample data collected by the State agency were to be used jointly with the Bureau of Labor Statistics for the preparation of State and national series. By 1928, five other States had entered into such compacts, and another five were added by 1936. Over the years, the amount of published data on employment and payrolls for States and areas underwent a constant expansion. In 1940, estimates of total nonagricultural employment for all 48 States and the District of Columbia were published for the first time.

The onset of World War II in 1939, followed by the entry of the United States after the assault on Pearl Harbor in December 1941, placed additional demands upon the Bureau's Employment Statistics program. The added responsibilities pointed up the need for greater uniformity among the various programs of establishment statistics on employment and related subjects which were being prepared by the BLS, the Bureau of the Census, and the agencies administering the emerging social security programs. While most improvements had to await the end of the war, several important advances took place during those years.

The most far reaching decision was to use as employment benchmarks the data on employment collected primarily for administrative purposes by the newly organized social insurance programs. Tabulations of such materials became available about 1940 from the unemployment insurance program and they soon became the preferred sources of benchmark data. They covered several industrial categories not covered by the Census of Manufacturers and Business, respectively, and they were available annually. After 1939, these were taken only at 5-year intervals.

As the unemployment insurance program developed, the feeling grew that the proper place to estimate State and area employment was in the State agencies rather than in Washington. By 1949, all States had joined the system, and since that year the industry employment statistics program has been a fully integrated Federal-State project which provides employment, hours, and earnings information on a national, State, and area basis in considerable industrial detail. This cooperative program has as its formal base of authority a Congressional act of July 7, 1930 (ch. 873, 46 Stat. 1019; 29 U.S.C. 2). In 1971 cooperative arrangements were in effect within 44 States and the District of Columbia and with 6 State labor departments.

Description of the Survey

The Bureau of Labor Statistics cooperates in collecting data each month on employment, hours, and earnings from a sample of establishments in all nonagricultural activities including government. In 1970, this sample included over 165,000 reporting units. From these data a large number of series on employment, hours, and earnings in considerable industry detail are prepared and published monthly for the United States as a whole, for each of the 50 States and the District of Columbia, and for most of the metropolitan areas. The data include series on total employment, production or nonsupervisory worker employment, women employed, average hourly earnings, average weekly hours, and average weekly overtime hours (in manufacturing). For many series, seasonally adjusted data also are published.

Concepts

An establishment is defined as an economic unit which produces goods or services, such as a factory, mine, or store. It is generally at a single physical location and it is engaged predominantly in one type of economic activity. Where a single physical location encompasses two or more distinct and separate activities these are treated as separate establishments, provided that separate payroll records are available and certain other criteria are met.[1] In the collection of data on employment, payrolls, and man-hours, the BLS usually requests separate reports by establishment. However, when a company has more than one establishment engaged in the same activity in a geographic area, these establishments may be covered by a combined report.

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[1] *Standard Industrial Classification Manual* (Bureau of the Budget, Executive Office of the President, 1967), p. x.

Industry employment statistics published by BLS and the cooperating State agencies represent the total number of persons employed either full-time or part-time in nonagricultural establishments during a specified payroll period. In general, data refer to persons who worked during, or received pay for, any part of the pay period that includes the 12th of the month. However, at the national level, data for Federal Government establishments generally refer to civilian personnel who worked on, or received pay for, the last day of the month, plus intermittent employees who worked any time during the month (e.g., Christmas temporary employees of the postal service).

Employed persons include both permanent and temporary employees and those who are working either full- or part-time. Workers on an establishment payroll who are on paid sick leave (when pay is received directly from the employer), on paid holiday or paid vacation, or who work during only a part of the specified pay period are counted as employed. Persons on the payroll of more than one establishment during the pay period are counted in each establishment which reports them, whether the duplication is due to turnover or dual jobholding. Persons are considered employed if they receive pay for any part of the specified pay period, but are not considered employed if they receive no pay at all for the pay period. Since proprietors, the self-employed, and unpaid family workers do not have the status of "paid employees," they are not included. Domestic workers in households are excluded from the data for nonagricultural establishments. Government employment statistics refer to civilian employees only.

The figure which includes all persons who meet these specifications is designated "all employees." Major categories of employment are differentiated from this overall total, primarily to ensure the expeditious collection of current statistics on hours and earnings; these groups of employees are designated production workers, construction workers, or nonsupervisory workers, depending upon the industry.

In manufacturing industries, data on employment, man-hours, and payrolls are collected for production workers. This group, in general, covers those employees, up through the level of working foremen, who are engaged directly in the manufacture of the product of the establishment. Among the exclusions from this category are persons in executive and managerial positions, and persons engaged in activities such as accounting, sales, advertising, routine office work, professional and technical functions, and force account construction.[2] Production workers in mining are defined in a similar manner. A more detailed description of the classes of employees included in the production and nonproduction workers categories in mining and manufacturing is shown on the facsimile of the BLS 790 A schedule on page 31 of this bulletin.

In contract construction, the term construction workers covers workers, up through the level of working foremen, who are engaged directly on the construction project either at the site or working in shops or yards at jobs ordinarily performed by members of construction trades. Exclusions from this category include executive and managerial personnel, professional and technical employees, and routine office workers.

Data on the employment, man-hours, and payrolls of nonsupervisory workers are collected from establishments in the transportation, communication, and public utility industries, in retail and wholesale trade, in finance, insurance, and real estate, and in most of the service industries. Nonsupervisory workers include most employees except those in top executive and managerial positions. (See facsimile of BLS 790 E, the reporting form for wholesale and retail trade, p. 32.)

The series on hours and earnings is based on reports of gross payroll and corresponding paid man-hours for production workers.[3] To derive these series, BLS collects the following data: (See facsimile of BLS 790 A on p. 31).

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[2] Force-account construction is construction work performed by an establishment, primarily engaged in some business other than construction, for its own account and use and by its own employees.

1. The number of full- and part-time production workers who worked during, or received pay for, any part of the pay period including the 12th of the month.

2. Total gross payrolls for production workers before deductions for old-age and unemployment insurance, group insurance, withholding tax, bonds, and union dues. The payroll figures also include pay for overtime, shift premiums, holidays, vacations, and sick leave paid directly by the firm to employees for the pay period reported. They exclude bonuses (unless earned and paid regularly each pay period) or other pay not earned in the pay period concerned (e.g., retrocative pay). Tips and the value of free rent, fuel, meals, or other payment in kind are not included.

3. Total man-hours worked (including overtime hours) during the pay period, hours paid for standby or reporting time, and equivalent man-hours for which employees received pay directly from the employer for sick leave, for holidays, vacations, and other leave paid to these employees. Overtime or other premium paid hours are not converted to straight-time equivalent hours.

4. Overtime man-hours for which premiums were paid because the hours worked were in excess of the number of hours of either the straight-time workday or workweek. Saturday and Sunday hours (or 6th and 7th day hours) are included as overtime only if overtime premiums were paid. Holiday hours worked as overtime are not included unless they are paid for at more than the straight-time rate. Hours for which only shift differential, hazard, incentive, or similar types of premiums were paid are excluded from overtime hours.

Overtime hours data are collected only from establishments engaged in manufacturing industries. For government organizations and private educational institutions, payrolls collected relate to all employees. Manhour data are not collected.

Industrial Classification

All national, State, and area employment, hours, and earnings series data are classified in accordance with the *Standard Industrial Classification Manual*, Office of Management and Budget, 1967. (See appendix D of this bulletin for a detailed description of this system.)

Reporting establishments are classified into significant economic groups on the basis of major product or activity as determined by the establishments' percent of total sales or receipts for the previous calendar year. This information is collected once each year on an "Industry Class Supplement" to the monthly report form. (See p. 33 for a facsimile of this form.) All data for an establishment making more than one product or engaging in more than one activity are classified under the industry of the most important product or activity, based on the percentages reported.

Time Period

Employment, hours, and earnings are measured for the pay period including the 12th of the month, which is standard for all Federal agencies collecting employment data on an establishment basis.

Data Sources

Sample Data

Each month the State agencies cooperating with the Bureau collect data on employment, payrolls, and man-hours from a sample of establishments. The respondent extracts these figures from his payroll records. These data are readily available as the employers must maintain such records for a variety of tax and accounting purposes. A response analysis survey of the reporting practices of a scientifically selected sample of reporting establishments in manufacturing industries showed that the reports were made out almost exclusively from their payroll records. The survey also showed that while a number of employers did not report precisely the data requested on the schedule for all items, these deviations were not all in the same direction. On balance, they tended to offset each other, and the net effects of incorrect reporting were quite insignificant.[4]

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[3] Unless otherwise indicated, the references in this chapter to production workers apply likewise to the construction worker and nonsupervisory categories.

Participation in the industry employment statistics program is entirely voluntary on the part of the reporters. However, in many industries, particularly in manufacturing, employers who have a high percentage of total employment in the industry supply reports regularly, and many have done so over a long period of years.

Benchmark Data

An employment benchmark is defined as a reasonably complete count of employment. The estimates are adjusted periodically, annually if possible, to new benchmark levels. Since 1939, the basic sources of benchmark information for "all employees" have been periodic tabulations of employment data by industry and, beginning with 1959, by size of establishment. These are compiled by State employment security agencies, according to uniform procedures specified by the Manpower Administration of the U.S. Department of Labor, from reports of establishments covered under State unemployment insurance laws. The State employment security agencies receive quarterly reports, from each employer subject to the laws, showing total employment in each month of the quarter, and total quarterly wages for all employees.[5] If the employer has more than 50 employees and operates more than one establishment in a State, he is required to make separate reports for each area (e.g., county) in which he operates and for each establishment in different industries. Employment is reported for the pay period of the month including the 12th, and reports are classified industrially according to the Standard Industrial Classification. The State employment security agencies cooperate closely with the Bureau of Labor Statistics in the assignments of industry classifications, so there is a high degree of uniformity in this respect between the benchmark and sample data.

In 1970, unemployment insurance data accounted for three-fourths of the total benchmark. For the group of establishments exempt from State unemployment insurance laws because of their small size[6] and for certain classes of nonprofit institutions, the data used are those provided by the national old-age insurance program administered by the Social Security Administration of the U.S. Department of Health, Education, and Welfare.

For industries not covered by either of the two programs, benchmarks are compiled from a number of special sources. The most important of these are the Interstate Commerce Commission (interstate railroads), the American Hospital Association (private nonprofit hospitals), the Office of Education in the U.S. Department of Health, Education, and Welfare, and the National Catholic Education Association (private schools, colleges, and universities), the U.S. Civil Service Commission (Federal Government), and the Governments Division of the Bureau of the Census (State and local government).[7]

Special efforts are made to classify establishments into the same industrial groupings for benchmark purposes as they are for monthly reporting. Wherever possible, employment for the standard midmonth pay period for March is used as the benchmark.

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[4] Young, Dudley E. and Goldstein, Sidney, "The BLS Employment Series and Manufacturing Reporting Practices," *Monthly Labor Review*, November 1957, pp. 1367–1371.

[5] The State employment security agencies are required to submit tabulations of these reports to the Manpower Administration each quarter. These tabulations are due in the Washington office of MA by the middle of the sixth month after the end of the quarter of reference. For example, the first quarter tabulation, which provides the basis of the BLS benchmarks, is due on September 15. Review and editing of these tabulations and preparation of national summaries from them requires several months additional work on the part of both BLS and MA before the benchmark is completed.

[6] In 1970 the unemployment insurance laws of 21 States and the District of Columbia covered all employers of 1 or more workers, 3 States covered employers of 3 workers or more, and the remaining 26 States covered employers of 4 workers or more. Beginning in 1972, all State unemployment insurance laws should cover employers of 1 or more workers.

[7] For a more detailed description of the benchmark, see Armknecht, Paul A., "BLS Establishment Estimates Revised to March 1970 Benchmark Levels," *Employment and Earnings*, September 1971, pp. 18–30.

Collection Methods

The primary collection of the current sample data is conducted by State agencies which have cooperative agreements with the BLS. In most States, this is the employment security agency, affiliated with the Manpower Administration, the organization which administers the State unemployment insurance program. In a few cases the State department of labor acts as the agency. The agencies mail schedules to a sample of establishments in the States each month. A "shuttle" schedule is used (BLS form 790 series); that is, one which is submitted each month in the calendar year by the respondent, edited by the State agency, and returned to the respondent for use again the following month. The State agency uses the information provided on the forms to develop State and area estimates of employment, hours, and earnings, and then forwards the data, either on the schedules themselves or in machine readable form, to the Washington, D.C., office of the Bureau of Labor Statistics, where they are used to prepare estimates at the national level.

The shuttle schedule has been used in this program since 1930, but there have been substantial changes in its design and in the data collected over the period. All aspects of the schedule, its format, the wording of the requested items and definitions, and the concepts embodied therein have been subjected to a continuing and intensive review over the entire period, not only by the staff of BLS and of the State agencies, but also by other government agencies and by numerous persons in private business and labor organizations. The report forms are not exactly alike for every industry, but most of them request data on total employment, number of women employees, number of production workers (in manufacturing and mining), construction workers (in contract construction industries), or nonsupervisory workers (in other nonmanufacturing industries), and, for these workers, data on payroll, paid man-hours, and for manufacturing, overtime man-hours. The schedule contains detailed instructions and definitions for the reports. There are several variants designed to meet the specific problems of different industries. (See facsimiles of BLS 790 A and, BLS 790 E, pp. 31 and 32.)

The technical characateristics of the shuttle schedule are particularly important in maintaining continuity and consistency in reporting from month to month. The design exhibits automatically the trend of the reported data during the year covered by the schedule, and therefore, the relationship of the current figure to the data for the previous month. The schedule also has operational advantages; for example, accuracy and economy are obtained by entering identifying codes and the address of the respondent only once a year.

All schedules are carefully edited by the State agencies each month to make sure that the data are correctly reported and that they are consistent within themselves, with the data reported by the establishment in earlier months, and with those reported by other establishments in their industry. This editing process is carried out in accordance with a detailed manual of instructions prepared by the Bureau of Labor Statistics. When the reports are sent to Washington, they are screened by use of an electronic computer to detect processing errors and reporting errors which may have escaped the first editing. Questionable cases discovered at any stage of the editing process are returned, if necessary, to the respondent for review and correction.[8]

Sampling

Sampling is used by BLS in its industry employment statistics program for collecting data in most industries, since full coverage would be prohibitively costly and time consuming. The sampling plan for the program must: (a) provide for the preparation of reliable monthly estimates of employment, hours of work, and weekly and hourly earnings which can be published promptly and regularly; (b) through a single general system, yield considerable industry detail for metropolitan areas, States, and the Nation; and (c) be appropriate for the existing framework of operating procedures, administrative practices, resource availability, and other institutional characateristics of the program.

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[8] Mendelssohn, Rudolph C. "Machine Methods in Employment Statistics," *Monthly Labor Review*, May 1955, pp. 567–569.

In developing the sample design, the universe of establishments was stratified first by industry and within each industry by size of establishment in terms of employment, using six standard size classes. Within each industry, an optimum allocation design was obtained by sampling with probability proportionate to average size of establishment within each of the strata. A total size of sample necessary to produce satisfactory estimates of employment had to be distributed among the size-class cells on the basis of average employment per establishment in each cell. In practice, this is equivalent to distributing the predetermined total number of establishments required in the sample among the cells on the basis of the ratio of employment in each cell to total employment in the industry. Within each stratum, the sample members are selected at random.

Under this type of design, large establishments fall into the sample with certainty. In nearly all industries, establishments with 250 or more employees are included in the sample with certainty and in many industries the cutoff is lower. The sizes of the samples for the various industries were determined empirically on the basis of experience and of cost considerations. In a manufacturing industry in which a high proportion of total employment was concentrated in a relatively few large establishments, a high percentage of total employment had to be included in the sample. Consequently, the sample design for such industries provides for a complete census of the larger establishments with only a few chosen from among the smaller establishments, or none at all if the concentration of employment in the larger establishments is great enough. On the other hand, in an industry where a large proportion of total employment is in small establishments, the sample design calls for inclusion of all large establishments, and also for a substantial number of the smaller establishments. Many industries in the trade and service divisions fall into this category. In order to keep the sample to a size which can be handled with available resources, it is necessary to accept samples in these divisions with a smaller proportion of universe employment than is the case for most manufacturing industries. Since individual establishments in these nonmanufacturing industries generally show less fluctuation from regular cyclical or seasonal patterns than establishments in manufacturing industries, these smaller samples (in terms of employment) generally produce reliable estimates.

This sample design, although aimed primarily at meeting the needs of the national program, provides a technical framework within which State and area sample designs can be determined. Since the estimates for States and areas generally are not prepared at the same degree of industry detail as the national estimates, the national design usually provides sufficient reports for the preparation of State and area estimates.[9]

Estimating Procedures

Employment

The "all-employee" estimates by industry are based on reasonably complete employment counts or "benchmarks." To obtain employment estimates for the individual estimating cells, the following three steps are necessary:

1. A total employment figure (benchmark) for the estimating cell, as of a specified month, is obtained from sources which provide a reasonably complete count of employment for the cell.

2. For each cell, the ratio of employment in one month to that in the preceding month (i.e., the link relative) is computed for sample establishments which reported in both months.

3. Beginning with the benchmark month, the estimate for each month is obtained by multiplying the estimate for the previous month by the link relative for the current month.

Application of the estimating procedure in preparing a series is illustrated by the following example: Assume that total employment for a given series was 50,000 in July. The reporting sample, composed of 60 establishments, had 25,000 employees in July and 26,000 in August, a 4-percent increase. To derive the August estimate, the change for identical establishments reported in the July–August sample is applied to the July estimate:

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[9] For the national sample, additional reports needed for State and area samples are added to those required by the national design.

$$50{,}000 \times \frac{26{,}000}{25{,}000} \text{(or 1.04)} = 52{,}000$$

This procedure for estimating current employment is known as the benchmark and link-relative technique. It is an efficient technique, taking advantage of a reliable complete count of employment and of the high correlation between levels of employment in successive months in identical establishments.

In addition to estimates of total employment by industry, the Bureau publishes data on production, construction, or nonsupervisory worker employment. For this purpose, the sample ratio for the current month of production workers to total employment is used. For example, the 60 sample firms which had 26,000 employees in August, reported an August production-worker figure of 19,500 resulting in a ratio of $\frac{19{,}500}{26{,}000}$ or .750. Using this ratio, production-worker employment in August is estimated to be 39,000 (52,000 multiplied by .750= 39,000). A similar ratio method is used to estimate the number of women employed.[10]

The estimates for each type of series (all employees, production workers, and women employees) for individual estimating cells are summed to obtain the corresponding totals for broader industry groupings and divisions.

Appropriate revisions, based on new benchmarks, are introduced into the employment series as required to correct for classification changes and for deviations resulting from the use of sample trends. In general, the benchmark month is March. The employment estimates which had been published previously for that month are compared with the new benchmark data. The amount of adjustment in the published employment information is indicated by this comparison. The all-employee series, for months between the current and the last preceding benchmark, are adjusted by wedging or tapering out the difference between the current benchmark and the estimate for the benchmark month back from the current benchmark to the last previous benchmark. This difference is assumed to have accumulated at a regular rate. The series for months subsequent to the benchmark month are revised by projecting the level of the new benchmark by the trend of the unadjusted series.

A comparison of the amounts of the revisions made since 1966, is presented in table 1.

Table 1. Nonagricultural employment estimates, by industry division, as a percentage of the benchmark for recent years

Industry division	1966	1967	1968	1969	1970
Total	99.9	100.0	100.4	99.8	100.0
Mining	100.5	99.5	101.7	101.5	100.0
Contract construction	99.7	101.6	99.5	99.0	100.1
Manufacturing	99.4	99.5	99.8	99.8	100.1
Transportation and public utilities	99.7	99.8	100.7	100.4	100.0
Wholesale and retail trade	100.1	100.7	100.3	100.0	100.1
Finance, insurance, and real estate	99.5	100.2	99.2	100.0	100.3
Services	100.3	99.8	99.2	99.1	99.6
Government	100.0	100.0	102.8	100.1	100.2

Hours and earnings

Independent benchmarks are not available for the hours and earnings series. Consequently, the levels shown are derived from the BLS reporting sample.

Since 1959, when benchmark data stratified by employment size became available through the employment security system, estimates of employment, hours, and earnings have been prepared by a cell structure which makes use of size and in some cases regional stratification. Experience in the preparation of current estimates shows that the six size classes as described under the sampling design can be combined into a maximum of three size classes for the purposes of preparing current estimates of hours and earnings, when stratification by size is needed.[11] Whenever a new national benchmark becomes available, national estimates of average weekly hours and average hourly earnings using eight size strata and four regional strata (Northeast, North Central, South, and West) are prepared. These estimates are used as a standard against which the published averages are compared. In some cases, this comparison indicates that some modification of the pattern of stratification is needed. If this is the case, a change is introduced into the estimating structure at the time of the next benchmark revision.

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[10] If permanent changes in the composition of the sample take place, the "production-workers, all-employee" ratios and the "women" ratios calculated from the sample are modified by a wedging technique described in this chapter under "Hours and Earnings." (See p. 25.)

a. *Average weekly hours and gross hourly earnings.* To obtain average weekly hours for an individual estimating cell, the sum of the man-hour totals reported by the plants classified in that cell is divided by the total number of production workers reported for the same establishments. Similarly, in computing average hourly earnings, the reported payroll total is divided by the reported man-hour total.

The first ratio estimates of average hourly earnings and average weekly hours are modified at the estimating cell level by a wedging technique designed to compensate for changes in the sample arising mainly from the voluntary character of the reporting.

For example, a first estimate of average hourly earnings for the current month, U_1, is obtained from aggregates from a matched sample of establishments reporting in the current and previous month. Similarly an estimate of average hourly earnings, U_o, for the previous month is calculated from the same matched sample. Hence, U_1-U_o is a measure of absolute change between the 2 months.

Note is then taken of the published estimate of average hourly earnings for the previous month, say V_o. Because the panel of establishments reporting in the sample is not absolutely fixed from month to month, there may be differences between V_o and U_o.[12] A final figure for the current month is obtained by making use of both pieces of information; the estimate is

$$V_1 = (0.9\ V_o + 0.1\ U_o) + (U_1 - U_o)$$

The procedure, reflected in this last equation, accepts the advantage of continuity from the use of the matched sample, and at the same time tapers or wedges the published estimate toward the level of the latest sample average. The same procedure is used to adjust the production-worker all-employee-ratio and the ratios for women with regard to changes in the composition of the sample between successive months.

Table 2. Number of industries for which "Primary" series are published under the BLS Industry Employment Statistics Program—employment, hours, and earnings, January 1971

Industry division	All employees	Production workers [1]	Women	Hours and earnings [2]	Average overtime hours
Total	417	362	402	364	150
Mining	12	11	9	11	—
Contract construction	278	11	11	11	.....
Manufacturing	11	277	278	277	146
Transportation and public utilities	25	16	21	19	.....
Trade	36	32	35	32	.....
Finance, insurance, and real estate	15	9	15	9	—
Services	23	5	22	5	—
Government	15	.....	.....	—	4
Total private	1	1	1	1	—
Total nonagriculture	1	1	1	.....	.....

[1] Production workers in manufacturing and mining; construction workers in contract construction; nonsupervisory workers, all other divisions.

[2] Average hourly earnings, average weekly hours, and average weekly earnings.

Weekly hours and hourly earnings for industries and groups above the basic estimating cell level are weighted averages of the figures for component cells and industries. The average weekly hours for each estimating cell are multiplied by the corresponding estimate of production-worker employment, to derive aggregate man-hours. Payroll aggregates are the product of aggregate man-hours and average hourly earnings. Payroll and man-hour aggregates for industry groups and divisions represent the sum of aggregates for component industries.

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[11] These combinations of size classes have been made because of operational economies. In particular, the preliminary estimates are based on less than full samples, and if the estimation of preliminary estimates was attempted using the full stratification pattern, there would be a number of cells for which there were no samples. Experiments and tests over several years indicate that estimates of hours and earnings prepared from the BLS sample using a maximum of three size strata generally do not differ significantly from those computed with four size strata or more.

[12] If the difference between the estimate and the average computed from the sample $(V_o - U_o)$, is too great, the sample average is accepted once it has been established that the difference is due to a permanent change in the composition of the sample, and the series is regarded as discontinuous at that point. In general, a difference greater than 3 percent is considered as defining a discontinuity or "break."

Average weekly hours for industry groups are obtained by dividing the man-hour aggregates by the corresponding production-worker employment estimates. Average hourly earnings for groups are computed by dividing the payroll aggregates by the man-hour aggregates. This method is equivalent to weighting weekly hours by estimated universe production-worker employment and hourly earnings by estimated universe man-hours.

For all levels, from individual estimating cells to major industry divisions, average weekly earnings are computed by multiplying average hourly earnings by average weekly hours.

b. *Overtime man-hours.* To obtain average weekly overtime hours in manufacturing industries, the sum of the overtime man-hours reported is divided by the number of production workers in the same establishments.

c. *Spendable average weekly earnings.* Before the majority of workers in lower income brackets were subject to Federal income and social security taxes, gross average weekly earnings were a satisfactory measure of trends in weekly earnings available for spending. After Federal income taxes began to affect the spendable earnings of an appreciable number of workers, a method was developed for approximating spendable earnings by deducting these taxes from gross earnings.[13]

The amount of individual income tax liability depends on the number of dependents supported by a worker as well as on the level of his gross income. Spendable earnings for workers by major industry division are computed and published for a worker with no dependents and a worker with three dependents.

Gross and spendable weekly earnings also are computed and published in terms of 1967 dollars, to give an approximate measure of changes in "real" gross and spendable weekly earnings, that is, in purchasing power since that base period. This series is computed by dividing the weekly earnings average (in current dollars) by the BLS Consumer Price Index for the same month.

d. Average hourly earnings, excluding overtime, in manufacturing are computed by dividing the total production-worker payroll for the industry group by the sum of total production-worker man-hours and one-half of total overtime man-hours, which is equivalent to payrolls divided by straight-time man-hours. This method excludes overtime earnings at 1½ times the straight-time rates; no further adjustment is made for other premium payment provisions.

e. Indexes of aggregate weekly man-hours and payrolls are prepared by dividing the current month's aggregates by the average for 1967.

Reliability of estimates

Although the relatively large size of the BLS establishment sample assures a high degree of accuracy, the estimates derived from it may differ from the figures that would be obtained if it were possible to take a complete census using the same schedules and procedures. As discussed previously a link relative technique is used to estimate employment. This requires the use of the previous month's estimate as the base in computing the current month's estimate. Thus, small sampling and response errors may cumulate over several months. To remove this accumulated error, the estimates are adjusted annually to new benchmarks. In addition to taking account of sampling and response errors, the benchmark revision adjusts the estimates for changes in the industrial classification of individual establishments (resulting from changes in their product which are not reflected in the levels of estimates until the data are adjusted to new benchmarks). In fact, at the more detailed industry levels, particularly within manufacturing, changes in classification are the major cause of benchmark adjustments. Another cause of differences, generally minor, arises from improvements in the quality of the benchmark data.

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[13] Utter, Carol, "The Splendable Earnings Series: A Technical Note on its Calculation," *Employment and Earnings and Monthly Report on the Labor Force*, February 1969, pp. 6-13.

One measure of the reliability of the employment estimates for individual industries is the root-mean-square error (RMSE). The measure is the standard deviation adjusted for the bias in estimates.

$$\text{RMSE}=\sqrt{(\text{Standard Deviation})^2+(\text{Bias})^2}$$

If the bias is small, the chances are about 2 out of 3 that an estimate from the sample would differ from its benchmark by less than the root-mean-square error. The chances are about 19 out of 20 that the difference would be less than twice the root-mean-square error.

The hours and earnings estimates for cells are not subject to benchmark revisions, although the broader groupings may be affected slightly by changes in employment weights. The hours and earnings estimated, however, are subject to sampling errors which may be expressed as relative errors of the estimates. (A relative error is a standard error expressed as a percent of the estimate.) Measures of root-mean-square errors for employment estimates and relative errors for hours and earnings estimates are provided in the "Technical Note" of *Employment and Earnings.*

Seasonally adjusted series

Many economic statistics, including employment and average weekly hours, reflect a regularly recurring seasonal movement which can be measured on the basis of past experience. By eliminating that part of the change which can be ascribed to usual seasonal variation, it is possible to observe the cyclical and other nonseasonal movements in these series. Seasonally adjusted series are published regularly for selected employment hours, and earnings series.

The seasonal adjustment method used for these series is an adaptation of the standard ratio-to-moving average method, with a provision for "moving" adjustment factors to take account of changing seasonal patterns. A detailed description of the method is given in appendix A of this bulletin.

The seasonally adjusted series on gross average weekly hours, average overtime hours and average hourly earnings are computed by applying factors directly to the corresponding unadjusted series, but seasonally adjusted employment totals for all employees and production workers by industry divisions are obtained by summing the seasonally adjusted data for component industries. Selected seasonally adjusted series also are prepared for aggregate weekly man-hours.

Presentation and Uses

At the national level, the program produces each month a total of over 2,600 separate published series. Tables 2, 3, and 4 provide a summary of the detail which is published currently. Table 2 describes the "primary" series produced by the program, that is, those computed directly from the sample and benchmark data.

Table 3 indicates the "special" series which are obtained from the primary series by application of special adjustments, while table 4 lists the seasonally adjusted series by type and industry division.

In addition to the series published on a current monthly basis, a single annual figure for employment in March of each year (based on benchmarks) is published for a number of industries for which monthly estimates do not currently meet established standards for publication. In 1971, following revision to the 1970 benchmark, data for 239 such industries were published.

In April 1971, employment and hours and earnings statistics were available for 50 States, the District of Columbia, and 211 areas. Approximately 8,200 employment series and hours and earnings series for about 3,400 industries were published for these States and areas by the State agencies. The employment series usually covered total nonagricultural employment, major industry divisions (e.g., contract construction, manufacturing), and major industry groups (e.g., textile mill products, transportation equipment, retail trade) for each State and area. Additional industry detail frequently is provided for the larger States and areas, particularly for industries which are locally important in the various jurisdictions.

The series on employment, and hours and earnings appear in several BLS publications.

Table 3. Number of industries for which special series are published under the BLS Industry Employment Statistics Program—employment, hours, and earnings, January 1971

Industry division	Index of aggregate weekly man-hours	Index of aggregate weekly payrolls	Spendable average weekly earnings [1]	Gross weekly earnings (1967 dollars)	Average hourly earnings (excluding overtime)
Total private			1	1	----
Mining, construction and manufacturing	1				----
Mining	1	1	1	1	----
Contract construction	1	1	1	1	----
Manufacturing	24	1	1	1	23
Transportation and public utilities			1	1	----
Trade	----	----	1	1	----
Finance, insurance and real estate		----	1	1	----
Services	----	----	1	1	----

[1] In current and 1967 dollars.

The summary data are first published each month in a press release which contains preliminary national estimates of nonagricultural employment, weekly hours, and gross average weekly and hourly earnings in the preceding month, for major industry categories. The release also includes seasonally adjusted data on employment, average weekly hours, and average overtime hours. The preliminary estimates are based on tabulations of data for less than the full sample to permit early release of figures. This release normally is issued 3 weeks after the week of reference for the data. The press release also includes a brief analysis of current trends in employment, hours, and earnings, pointing up current developments as compared with those for the previous month and the same month in the preceding years.

National estimates in the detail described in tables 2, 3, and 4 are published in the monthly report *Employment and Earnings*. This publication is issued about 5 weeks after the week of reference. Employment data for total nonagricultural employment and for the major industry divisions, as well as hours and earnings for all manufacturing, are published for States and areas in *Employment and Earnings* 1 month later than those for the Nation. Special articles analyze long-term economic movements or describe technical developments in the program. Many of the national series are republished in the *Monthly Labor Review* with data shown for each series for the most recent 13 months.

Following each benchmark revision, an historical volume called *Employment and Earnings, United States* is published. This provides historical data, monthly and annual averages, from the beginning date of each series, in a few instances as far back as 1909. A companion volume, *Employment and Earnings, States and Areas*, provides historical data (annual averages) on all employees and on production-worker hours and earnings series published by State agencies for States and areas back to the beginning of these series, in some instances to 1939. This volume is published annually. Detailed industry rates are available monthly in releases published by the cooperating State agencies.

The data are disseminated also through the publications of many other Federal agencies; e.g., the Department of Commerce, the Board of Governors of the Federal Reserve System and the Council of Economic Advisors republish all or part of the data. They are also regularly republished in summary form or for specific industries in many trade association journals, the labor press, and in general reference works.

These series are used by labor unions, business firms, universities, trade associations, private research organizations, and many government agencies. Research workers in labor unions and industry, as well as others responsible for analyzing business conditions, use the trends reflected in these particular statistics as economic indicators. The average weekly hours series are utilized as lead indicators of swings in the business cycle. Labor economists and other social scientists find these series to be an important indicator of the Nation's economic activity, as well as a measure of the well-being of the millions of Americans who depend on salaries and wages. Industrial growth and progress may be assessed by using the employment and hours series in conjunction with other economic data to yield measures of productivity.

Analysts study employment trends to detect

Table 4. Number of seasonally adjusted series published under the BLS Industry Employment Statistics Program—employment, hours, and earnings, January 1971

Industry division	Seasonally adjusted series							
	All employees	Production workers	Index of employment	Average weekly earnings	Average hourly earnings	Average weekly hours	Man hour index	Average overtime hours
Total nonagriculture	1	—	1	—	—	—	—	—
Total private	—	—	—	1	1	1	—	—
Mining, construction, and manufacturing	—	1	—	—	—	—	1	—
Mining	1	1	1	—	1	1	1	—
Contract construction	1	1	1	—	1	1	1	—
Manufacturing	24	24	1	—	1	24	24	3
Transportation and public utilities	1	—	1	—	1	1	—	—
Trade	3	—	3	—	1	3	—	—
Finance, insurance, and real estate	1	—	1	—	1	1	—	—
Services	1	—	1	—	1	1	—	—
Government	1	—	1	—	—	—	—	—

changes in industrial structure, and to observe growth and decline proclivities of individual industries. They also are used in the Bureau's Occupational Outlook program as a basis for projection of future trends.

Executives use the employment, earnings, and hours data for guidance in plant location, sales, and purchases. Also, firms negotiating long-term supply or construction contracts often utilize series on average hourly earnings as an aid in reaching an equitable agreement; "escalation clauses" may be included in the contracts, which permit an increase or a lowering of the settlement price depending on the movement of average hourly earnings in a selected industry.[14] Wide need has been demonstrated by both labor and business for industry series on hourly earnings and weekly hours, to provide a basis for labor-management negotiations. They not only furnish current and historical information on a given industry but provide comparative data on related industries.

Limitations

Employment

Total employment in nonagricultural establishments from the "payroll" survey is not directly comparable with the Bureau's estimates of the number of persons employed in nonagricultural industries, obtained from the monthly "household" survey.[15] The "payroll" series excludes unpaid family workers, domestic servants in private homes, proprietors and other self-employed persons, all of whom are covered by the household survey. Moreover, the "payroll" series counts a person employed by two or more establishments at each place of employment, while the "household" survey counts him only once, and classifies him according to his single major activity. Certain persons on unpaid leave are counted as employed under the "household" survey, but are not included in the employment count derived from the "payroll" series. In addition to these differences in concept and scope, the surveys employ different collection and estimating techniques. Therefore, although each survey measures changes in employment, direct comparability should not be expected. However, over time, the trends are similar. The household survey places its primary emphasis on the employment status of individuals and also provides a great deal of information on the demographic characteristics (e.g., sex, age, race) of the labor force. The survey is not well suited to providing detailed information on the industrial and the geographic distribution of employment. The establishment survey, while providing limited information on personal characteristics of workers, is an excellent vehicle for obtaining these detailed industrial and geographic data, and in addition, it provides hours and earnings information which is directly related to the employment figures. The payroll and household surveys therefore may be regarded as complementary.

Employment estimates derived by the Bureau of the Census from its quinquennial censuses and from the annual sample surveys of manufacturing establishments may differ from BLS employment statistics. The most important reason for difference stems from the degree to which multiproduct establishments file separate or combined reports in one survey but not the other, which may result in different industrial classification of employment. There is also a significant difference at the more detailed industry levels, since Census classifies auxiliary units and central and district administrative units on the basis of the most appropriate 2-digit major group, while BLS codes these units to the most appropriate 4-digit industry. For broad categories, however, the two surveys do show similar levels and trends.

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[14] Nelson, Darrell, "BLS Earnings Statistics for Use in Escalation Agreements," *Employment and Earnings and Monthly Report on the Labor Force*, March 1968, pp. 18–21.

[15] See chapter 1 for a description of this survey.

Hours and earnings

The workweek information relates to average hours paid for, which differ from scheduled hours or hours worked. Average weekly hours reflect the effects of such factors as absenteeism, labor turnover, part-time work, and strikes.

The gross average hourly earnings series reflect actual earnings of workers, including premium pay. They differ from wage, rates, which are the amounts stipulated for a given unit of work or time. Gross average hourly earnings do not represent total labor costs per man-hour for the employer, for they exclude retroactive payments and irregular bonuses, various welfare benefits, and the employer's share of payroll taxes. Earnings for those employees not covered under the production worker and nonsupervisory-employee categories are, of course, not reflected in the estimates.

The series on spendable weekly earnings measure the net earnings of workers who earn the average gross weekly earnings, have the specified number of dependents, and take the standard deductions for Federal income tax purposes. Spendable earnings reflect deductions only for Federal income and social security taxes (calculated on the basis of total annual liabilities), and thus represent only a rough approximation of disposable earnings.[16] They do not take into account payroll deductions for such purposes as State income taxes, union dues, or group insurance, and they do not reflect such factors as total family income or tax deductions above the standard amount.

The "real" earnings data (those expressed in 1967 dollars), resulting from the adjustment of gross and spendable average weekly earnings by means of the Bureau's Consumer Price Index, indicate the changes in the purchasing power of money earnings as a result of changes in prices for consumer goods and services. These data cannot be used to measure changes in living standards as a whole, which are affected by other factors such as total family income, the extension and incidence of various social services and benefits, and the duration and extent of employment and unemployment.

To approximate straight-time average hourly earnings, gross average hourly earnings are adjusted by eliminating only premium pay for overtime at the rate of time and one-half. Thus, no adjustment is made for other premium payment provisions such as holiday work, late-shift work, and premium overtime rates other than at time and one-half.

The ultimate goal of the program is to provide current estimates of employment, hours, and earnings for all nonagricultural industries in the Nation as a whole, and also for all significant industries in all States and all Standard Metropolitan Statistical Areas, as defined by the Office of Management and Budget. While very substantial progress toward this objective has been made over the years, and particularly since the end of World War II, there remain some important areas where the goal is yet to be realized. Efforts constantly are being directed toward strengthening the sample so that series for employment, hours, and earnings for additional industries may be published, and also toward developing series for additional standard metropolitan areas.

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[16] For a complete analysis of the difference between spendable and disposable earnings, see Paul Schwab, "Two Measures of Purchasing Power Contrasted," *Monthly Labor Review*, April 1971.

BLS Codes

State	Report No.	Ind.		

Form BLS 790 A

LOCATION OF ESTABLISHMENTS COVERED IN THIS REPORT
(Number of establishments) (City) (County) (State)

The Bureau of Labor Statistics and the State agencies cooperating in its statistical programs will hold all information furnished by the respondent in strict confidence.

Before entering data see explanations on other side

Year and Month	PAY PERIOD				DO NOT USE	ALL EMPLOYEES		PRODUCTION AND RELATED WORKERS			YOUR COMMENTS	
	Enter beginning and ending dates of pay period which includes the 12th of the month		Enter the number of days worked plus paid holidays and paid vacation days for majority of production workers. (*Nearest ½ day*)			NUMBER Include all persons who worked during or received pay for any part of period regardless of type of work performed		Enter in these columns the number of production and related workers who worked during or received pay for any part of the period reported, the pay earned (before deductions), and all hours worked or paid for. Include pay and man-hours for overtime, sick leave, holidays, and vacations			Enter in column 13 the main factors responsible for significant month-to-month changes in employment, average hours worked (col. 11÷col. 9), average hourly earnings (col. 10÷col. 11), etc., as indicated by this report. Examples are: *Wage rate increase* *Strike* *Overtime* *More business* *Fire* *Weather*	
	From— (*Both dates*	Through *inclusive*)	During the entire pay period	During the 7 consecutive-day period which includes the 12th	L/P	Both sexes	Women only	Number of Production Workers	Total Production-Worker Payroll (*Omit cents*)	Total Production-Worker Man-Hours (*Omit fractions*)	DO NOT USE Expl. Code	If any general wage-rate changes (not individual changes for length of service, merit, or promotion) have occurred since last month's report note amount of increase or decrease (as +2%, −5¢), the effective date of the change, and the approximate number of production workers affected.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1970 Dec.									$			
1971 Jan.												
Feb.												
Mar.												
Apr.												
May												
June												
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												

(Person to be addressed if questions arise regarding this report)

(Position)

BLS Codes

State	Report No.	Ind.		

Form BLS 790 E

Before entering data see explanations on other side

LOCATION OF ESTABLISHMENT(S) COVERED IN THIS REPORT

(Number of establishments) (City) (County) (State)

The Bureau of Labor Statistics and the State agencies cooperating in its statistical programs will hold all information furnished by the respondent in strict confidence.

YEAR AND MONTH	PAY PERIOD				DO NOT USE	ALL EMPLOYEES		NONSUPERVISORY EMPLOYEES						DO NOT USE		
	Enter beginning and ending dates of pay period which includes the 12th of the month		Enter the number of days worked plus paid holidays and paid vacation days for majority of nonsupervisory employees. (*Nearest ½ day*)			NUMBER Include all persons who worked during or received pay for any part of period regardless of type of work performed		Enter in these columns the number of nonsupervisory employees who worked during or received pay for any part of the period reported, the pay earned (before deductions but excluding commissions,) and all hours worked or paid for. Include pay and man-hours for *overtime*, sick leave, holidays, and vacations			COMMISSIONS OF NONSUPERVISORY EMPLOYEES					
	From— (*Both dates inclusive*)	Through	During the entire pay period	During the 7 consecutive day period which includes the 12th	L/P	Both sexes	Women only	NUMBER OF NONSUPERVISORY EMPLOYEES	NONSUPERVISORY-EMPLOYEE PAYROLL (Excluding commissions reported in col. 10A) (*Omit cents*)	TOTAL NONSUPERVISORY-EMPLOYEE MAN-HOURS (*Omit fractions*)	Amount of commissions (*omit cents*)	Period in which earned From— (*Both dates inclusive*)	Through	P R	H	Expl code
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(10A)	(10B)	(10C)	(10a)	(11a)	(12)
1970 Dec									$		$					
1971 Jan																
Feb																
Mar																
Apr																
May																
June																
July																
Aug																
Sept																
Oct																
Nov																
Dec																

YOUR COMMENTS ON CHANGES IN EMPLOYMENT, PAYROLL, OR WAGE RATES

Enter in column 13 the main factors responsible for significant month-to-month changes in the report above. Examples are: *Wage rate increase, more business, fire, temporary summer help, overtime, strike, weather.*

If any GENERAL WAGE-RATE CHANGES (not individual changes for length of service, merit, or promotion) have occurred since last month's report, note the amount of increase or decrease (as +2%, −5¢), the effective date of the change, and the approximate number of nonsupervisory employees affected.

(13)	(13)	(13)
1971 Jan	1971 May	1971 Sept.
Feb	June	Oct
Mar	July	Nov
Apr	Aug	Dec

(Person to be addressed if questions arise regarding this report)

(Position)

BLS 790 Industry Class Supplement

Budget Bureau No. 44–R745
Approval expires January 31, 1972

MANUFACTURING

STATEMENT OF PRODUCTS

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Return this form as soon as possible in the enclosed envelope which requires no postage.

SAMPLE COPY

The Bureau of Labor Statistics and the State agencies cooperating in its statistical programs will hold all information furnished by the respondent in strict confidence.

LOCATION ______________________________
(City) (County) (State)

BLS CODES	State	Report No.	Ind.	Empl.	Mo. Yr.	Proposed Ind.			UI CODE	Ind.	Mo. Yr.

This report will be used to insure the proper industrial classification of your regular MONTHLY REPORT ON EMPLOYMENT, PAYROLL, AND HOURS and should cover the entire activity of the same establishment.

Classification will be by industry on the basis of the principal product or activity of your establishment during the calendar year 1970. Describe your processes or goods produced in your own words, making the distinctions requested on the list of special characteristics provided on the enclosed sheet. This list is not complete but represents the kind of information which should be reported.

Principal Products or Activities During 1970 (List items separately) (a)	Percent of Total Sales Value or Receipts During 1970 (b)	Principal Materials Used (For each product listed in column (a)) (c)	Was Material Used Produced In This Establishment? (d) Yes	No
1A. Manufacturing (Specify below)			Yes	No
	%			
	%			
	%			
	%			
	%			
	%			
1B. Nonmanufacturing (Specify below)				
	%			
	%			
	%			
	%			
Combined Total	100%			

3. Is the establishment primarily engaged in performing services for other units of the company? Yes ☐ No ☐
If "Yes," indicate nature of activity of this establishment:
☐ Central administrative office
☐ Research, development, or testing
☐ Storage (warehouse)
☐ Other (Specify: power plant, etc.) ____________

2. Is this establishment part of a multiunit company?
☐ Yes ☐ No
If "Yes," enter name and location of controlling company.
____
____

4. Space for Your Comments.

____
(Person to be addressed if questions arise regarding this report)

____
(Position)

☆ U.S. GOVERNMENT PRINTING OFFICE : 1970—O-398-164

Technical References

Number

1. Armknecht, Paul A. Jr., "BLS Establishment Estimates Revised to March 1970 Benchmark Levels," *Employment and Earnings*, September 1971, pp. 18–30.

2. "The Calculation and Uses of the Spendable Earnings Series," *Monthly Labor Review*, April 1966, pp. 405–409.

3. Mendelssohn, Rudolph C. "Machine Methods in Employment Statistics," *Monthly Labor Review*, May 1955, pp. 567–569.

   A description of the use of electronic data-processing equipment in the preparation of employment statistics, with particular reference to screening employers' reports for errors.

4. President's Committee to Appraise Employment and Unemployment Statistics, *Measuring Employment and Unemployment*, 1962.

   A comprehensive review and critique of the methods and concepts used by various Federal Government programs providing statistics on employment, unemployment, and the labor force in the United States.

5. Nelson, Darrell R., "BLS Earnings Statistics for Use in Escalator Agreements," *Employment and Earnings and Monthly Report on the Labor Force*, March 1968, pp. 18–21.

   A discussion of the availability, uses, and limitations of BLS average hourly earnings series in escalation agreements.

6. Schechter, Samuel, "The 1959 Benchmarks for the BLS Payroll Employment Statistics," *Monthly Labor Review*, December 1962, pp. 1385–1392.

   A detailed description of the sources and construction of BLS employment benchmarks.

7. Schwab, Paul M., "Two Measures of Purchasing Power Contrasted," *Monthly Labor Review*, April 1971, pp. 3–14.

   An examination of the divergent trends in real net spendable earnings and real per capita disposable income.

8. Utter, Carol M., "The Spendable Earnings Series: A Technical Note on its Calculation," *Employment and Earnings and Monthly Report on the Labor Force*, February 1969, pp. 11–21.

9. Weinberg, Edgar, "BLS Earnings Series as Applied to Price Escalation," *Monthly Labor Review*, July 1952, pp. 57–59.

   A discussion of the use of BLS average hourly earnings series in escalation clauses in contracts.

10. Wymer, John P., "The Revised and Expanded Program of Current Payroll Employment Statistics," *Employment and Earnings*, November 1961, pp. iv–vii.

    A description of the impact of a major benchmark adjustment and of important technical innovations on the industry employment statistics series.

11. Young, Dudley E. and Sidney Goldstein, "The BLS Employment Series and Manufacturing Reporting Practices," *Monthly Labor Review*, November 1957, pp. 1367–71.

    A discussion of the findings in a survey analyzing the response patterns of manufacturing establishments cooperating in the industry employment statistics program.

—PAUL A. ARMKNECHT, JR.

Chapter 3. Job Vacancies and Labor Turnover

Background

Job vacancies, as used by the Bureau of Labor Statistics, refers to the number of unfilled wage and salary jobs available to workers at the end of a month. Labor turnover refers to the gross movement of wage and salary workers into and out of employment status with respect to individual establishments during the month.

The current job vacancy-labor turnover program began in January 1969 with the addition of questions about job vacancies to the labor turnover questionnaire. The labor turnover program, however, has been in existence for many years.

In January 1926, the Metropolitan Life Insurance Co. began the collection of labor turnover data from a small sample of manufacturing establishments. By February 1927, the sample included 175 establishments with 800,000 employees, which was estimated to be about 8 to 10 percent of total manufacturing employment at the time. The original purpose of this series was to provide personnel managers with national figures on labor turnover rates for manufacturing industries against which they could measure the experience of their own plants. Between November 1927 and July 1929, the Metropolitan Life Insurance Co. published labor turnover rates for total manufacturing. By the latter date, the company felt the project was sufficiently successful and well established to warrant turning it over to the Bureau of Labor Statistics for further development. A decade later, in December 1939, series on labor turnover rates were being published for 30 manufacturing industries, and the sample upon which the rates for all manufacturing were based contained 5,500 establishments and nearly 2,600,000 employees.

For a number of years, State employment security agencies affiliated with the Bureau of Employment Security (now the U.S. Training and Employment Service) had collected labor turnover information for use in job market analysis and as a guide for the operations of the State employment services. Cooperative arrangements between these agencies and the Bureau of Labor Statistics for the joint collection of labor turnover data began with an agreement with Connecticut in 1954. By 1964, the cooperative program had been extended to cover all 50 States and the District of Columbia.

Experimental programs to determine the feasibility of collecting job vacancy information were conducted in 1965 and 1966. The 1965 study was carried out in 16 metropolitan areas and the 1966 study was conducted in 14 metropolitan areas and three States. Following the successful completion of these programs, cooperative arrangements for the collection of job vacancy data were set up between the BLS and 48 of the State employment services, through the Manpower Administration.

In December 1970, these agencies published about 8,000 labor turnover series in manufacturing and mining industries for State and areas, and about 130 job vacancy area series in manufacturing industries. These rates were based on a sample of approximately 32,000 reports in manufacturing and about 1,200 in mining.

Description of the Survey

Labor turnover actions are divided into two broad groups: accessions or additions to employment, and separations or terminations of employment. These two broad groups are further divided; accessions into new hires and other accessions, and separations into quits, discharges, layoffs, and other separations. Labor turnover is expressed in the BLS series as a monthly rate per 100 employees. Separate rates are computed for each of the component items.

The primary difference between types of separations is whether action is initiated by the employee or employer, i.e., whether it is voluntary on the employee's part or involuntary. Voluntary actions—quits—are initiated by the employee for an almost unlimited variety of reasons, financial, personal, or social, (e.g., lack of housing and transportation, poor community facilities, etc.). Involuntary actions either may be initiated by the employer or be beyond the control of both employer and employee; these actions may arise from economic causes such as business conditions, physiological reasons such as aging, or performance reasons such as incompetence.

Job vacancy data are collected both for total job vacancies and for vacancies which have continued unfilled for 30 days or more. Data on the occupations for which the vacancies exist and the wage rates offered for them are also collected quarterly. Vacancy data are expressed as a monthly rate equal to job vacancies divided by the sum of vacancies and employment, with the quotient multiplied by 100.

Concepts

Separations are terminations of employment of persons who have quit or been taken off the rolls for reasons such as layoff, discharge, retirement, death, military service expected to last more than 30 consecutive calendar days, physical disability, etc. Since January 1959, transfers of employees to other establishments of the same company also have been classified as separations.

Quits are terminations of employment initiated by employees for any reason except retirement, transfer to another establishment of the same firm, or service in the Armed Forces. Included as quits are persons who failed to report after being hired (if previously counted as accessions), and unauthorized absences which, on the last day of the month, have lasted more than 7 consecutive calendar days.

Layoffs are suspensions from pay status (lasting or expected to last more than 7 consecutive calendar days), initiated by the employer without prejudice to the worker, for reasons such as lack of orders, model changeover, termination of seasonal or temporary employment, inventory-taking, introduction of labor saving devices, plant breakdown, or shortage of materials.

Discharges are terminations of employment initiated by the employer for such reasons as incompetence, violation of rules, dishonesty, laziness, absenteeism, insubordination, failure to pass probationary period, etc.

Other separations include terminations of employment for military duty lasting or expected to last more than 30 days, retirement, death, permanent disability, failure to meet the physical standards required, and transfers of employees to another establishment of the company.

Accessions are all permanent and temporary additions to the employment roll, whether of new or rehired employees. Transfers from another establishment of the same company also are counted as accessions (beginning with January 1959).

New hires are permanent and temporary additions to the employment roll of persons who have never before been employed by the establishment, and former employees rehired although not specifically recalled by the employer. This category excludes transfers from other establishments of the same company and employees returning from military service or unpaid leaves of absence.

Other accessions include all additions to the employment roll other than new hires.

Job vacancies are defined as vacant jobs which are immediately available for filling, and for which the firm is actively trying to find or recruit workers from outside the firm.

"Actively trying to find or recruit" means that the establishment is engaged in current efforts to fill the job vacancies.

Long-term job vacancies are those current vacancies which have continued unfilled for 30 days or more.

The reporting establishment is also asked to indicate the number of openings with future starting dates for which the firm is actively trying to recruit workers from outside the firm. Job openings with future starting dates may exist for such reasons as: Job unavailable until expected separation of present incumbent occurs; work will not start until some future date; new branch to be opened in the future; or anticipated increase in business.

Industry Classification

The classification system used for compiling and publishing rates is that described in the 1967 *Standard Industrial Classification Manual* issued by the Office of Management and Budget. (See appendix B of this bulletin for a detailed description of this system.)

Reporting establishments are classified on the basis of major product or activity as determined by annual sales data for the previous calendar year. Most establishments in the job vacancy-labor turnover sample also report employment, hours, and earnings under the Bureau's industry employment statistics program, and are assigned the same industry classification in both programs. Further discussion of industry classification in the two programs is given under the heading, Industrial Classification in chapter 2 of this bulletin.

Occupational Classification

Occupational classifications are made in accordance with those established in the Dictionary of Occupational Titles, Third Edition, U.S. Department of Labor, 1965. These classifications are the same as those used in State employment service operations.

Data Sources

Each month cooperating State employment security agencies collect data on the number of job vacancies and on labor turnover actions from a sample of establishments drawn from a list of those subject to State unemployment insurance programs. In nonmanufacturing, supplemental sources are also used to obtain lists of establishments which are not covered by Unemployment Insurance laws. (See chapter 2, p. 17 of this bulletin.) The respondent extracts the figures largely from his personnel records, though some smaller establishments which do not maintain special personnel records utilize their payroll records in making out the reports. Response analysis surveys, which analyzed the reporting practices of a scientifically selected sample of the establishments in the job vacancy-labor turnover panel, showed that while some employers did not report the figures for all items precisely as requested on the schedule, the effect of these deviations on the published data appeared to be quite insignificant, particularly for the broader classes, such as total accessions, total separations, and total job vacancies.

Collection Methods

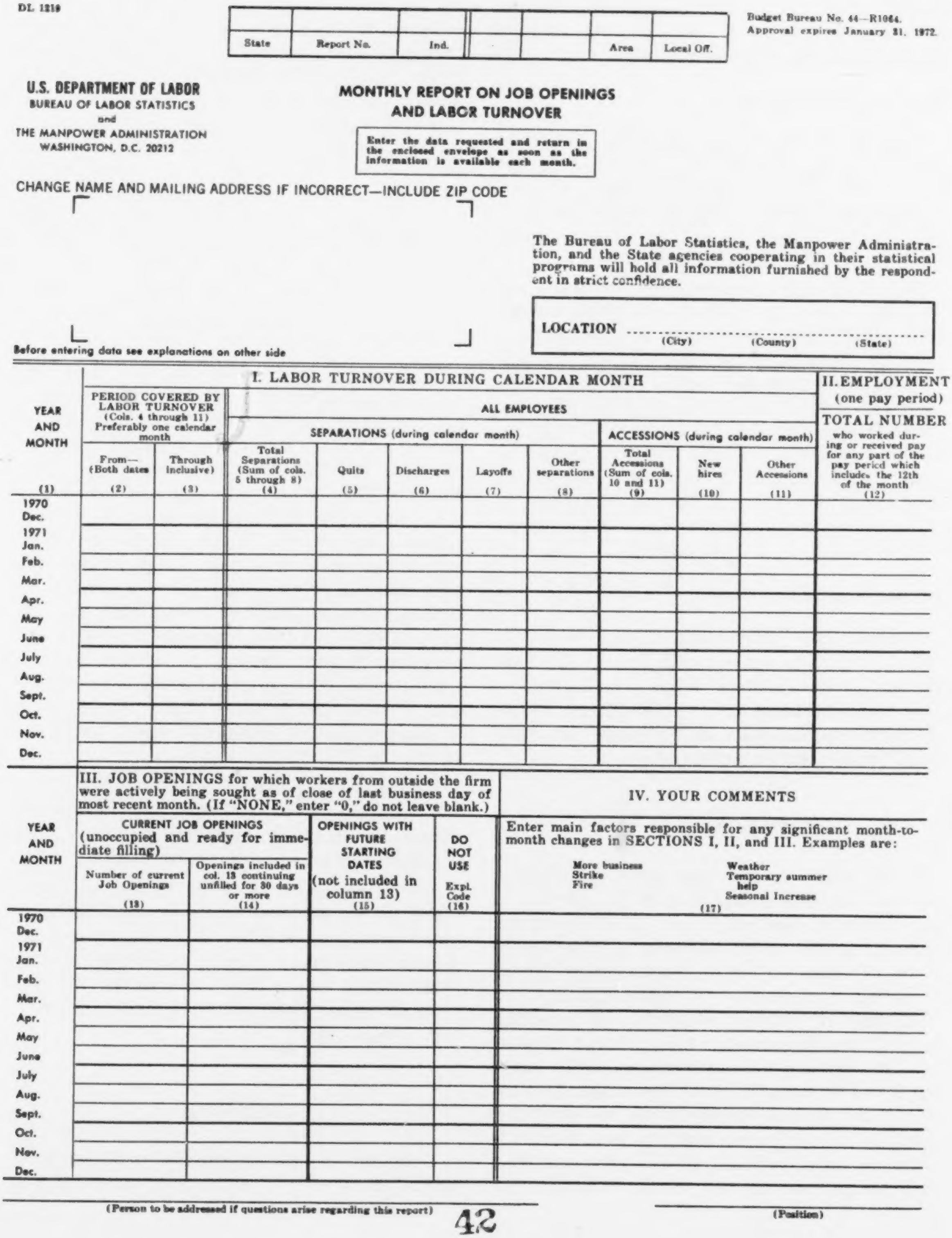
Job vacancy and labor turnover data are collected primarily at the State level by employment security agencies from cooperating employers via the medium of a mailed "shuttle" schedule, U.S. Department of Labor form 1219. (See pp. 38 and 39 for a facsimile of this schedule.) The same form is returned to the respondent each month of the year for the entry of current data. The respondent reports the total number of job vacancies, the number of actions for each turnover item during the calendar month and total employment. These employment figures, which are the bases used to compute the rates, represent the number of persons who worked or received pay for any part of the pay period (usually 1 week) which includes the 12th of the month.

Information on the occupations for which job vacancies exist and the pay rate being offered for them is collected quarterly on a supplemental schedule, form DL 1219A.

The State agency uses the information provided on the schedule to develop job vacancy and labor turnover rates for the States and for metropolitan areas, and forwards the data to Washington, where they are used by the Bureau of Labor Statistics to prepare rates at the national level.

Sampling

Sampling is used by BLS for collecting data in its job vacancy-labor turnover statistics pro-



DL 1219

State	Report No.	Ind.			Area	Local Off.

Budget Bureau No. 44—R1064.
Approval expires January 31, 1972.

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
and
THE MANPOWER ADMINISTRATION
WASHINGTON, D.C. 20212

MONTHLY REPORT ON JOB OPENINGS AND LABOR TURNOVER

Enter the data requested and return in the enclosed envelope as soon as the information is available each month.

CHANGE NAME AND MAILING ADDRESS IF INCORRECT—INCLUDE ZIP CODE

The Bureau of Labor Statistics, the Manpower Administration, and the State agencies cooperating in their statistical programs will hold all information furnished by the respondent in strict confidence.

LOCATION ....
(City) (County) (State)

Before entering data see explanations on other side

YEAR AND MONTH	I. LABOR TURNOVER DURING CALENDAR MONTH										II. EMPLOYMENT (one pay period)
	PERIOD COVERED BY LABOR TURNOVER (Cols. 4 through 11) Preferably one calendar month		ALL EMPLOYEES								TOTAL NUMBER
			SEPARATIONS (during calendar month)					ACCESSIONS (during calendar month)			
(1)	From— (Both dates (2)	Through inclusive) (3)	Total Separations (Sum of cols. 5 through 8) (4)	Quits (5)	Discharges (6)	Layoffs (7)	Other separations (8)	Total Accessions (Sum of cols. 10 and 11) (9)	New hires (10)	Other Accessions (11)	who worked during or received pay for any part of the pay period which includes the 12th of the month (12)
1970 Dec.											
1971 Jan.											
Feb.											
Mar.											
Apr.											
May											
June											
July											
Aug.											
Sept.											
Oct.											
Nov.											
Dec.											

YEAR AND MONTH	III. JOB OPENINGS for which workers from outside the firm were actively being sought as of close of last business day of most recent month. (If "NONE," enter "0," do not leave blank.)				IV. YOUR COMMENTS
	CURRENT JOB OPENINGS (unoccupied and ready for immediate filling)		OPENINGS WITH FUTURE STARTING DATES (not included in column 13)	DO NOT USE	Enter main factors responsible for any significant month-to-month changes in SECTIONS I, II, and III. Examples are:
	Number of current Job Openings (13)	Openings included in col. 13 continuing unfilled for 30 days or more (14)	(15)	Expl. Code (16)	More business Strike Fire Weather Temporary summer help Seasonal Increase (17)
1970 Dec.					
1971 Jan.					
Feb.					
Mar.					
Apr.					
May					
June					
July					
Aug.					
Sept.					
Oct.					
Nov.					
Dec.					

(Person to be addressed if questions arise regarding this report)

(Position)

INSTRUCTIONS FOR COMPLETING THIS FORM

I. LABOR TURNOVER

PERIOD COVERED.—Information on labor turnover, cols. 4 through 11, is requested for the most recent *entire calendar month* specified in column 1 or, if this is not possible, for a period which most closely covers that calendar month. In either case enter in cols. 2 and 3 the beginning and ending dates for the monthly period for which turnover data are reported.

SEPARATIONS (ALL EMPLOYEES)

Column 4. **TOTAL SEPARATIONS DURING CALENDAR MONTH.**.— Enter in column 4 the sum of columns 5 thru 8.

Column 5. **QUITS.**—A quit is a termination of employment *initiated by the employee* for any reason except to retire, to transfer to another establishment of the same firm, or for service in the Armed Forces. Include a person who fails to report after being hired (if previously counted as an accession) and an unauthorized absence if on the last day of the month the person has been absent more than 7 consecutive calendar days.

Column 6. **DISCHARGE.**—A discharge is a termination of employment *initiated by the employer* for such reasons as incompetence, violation of rules, dishonesty, laziness, absenteeism, insubordination, failure to pass probationary period, etc. Inability to meet organization's physical standards should be reported in other separations, col. 8.

Column 7. **LAYOFFS.**—A layoff is a suspension from pay status (lasting or expected to last more than 7 consecutive calendar days without pay) initiated by the employer *without prejudice to the* worker for such reasons as: lack or orders, model changeover, termination of seasonal or temporary employment, inventory-taking, introduction of labor saving devices, plant breakdown, shortage of materials, etc.; *include temporarily furloughed employees and employees placed on unpaid vacations.*

Column 8. **OTHER SEPARATIONS.**—This group should include only terminations of employment for military duty lasting or expected to last more than 30 calendar days, retirement, death, permanent disability, failure to meet the physical standards required, and transfers of employees to another establishment of the company. NOTE: If you include any other types of separations in this column, mention the number and type under Comments. Employees involved in labor-management disputes should not be counted as separations.

ACCESSIONS (ALL EMPLOYEES)

Column 9. **TOTAL ACCESSIONS DURING CALENDAR MONTH.**—An accession is any permanent or temporary addition to the employment roll whether of new or former employees, or transfers from another establishment of the company. Enter in column 9 the sum of cols. 10 and 11.

Column 10. **NEW HIRES.**—New hires are temporary or permanent additions to the employment roll of (1) anyone who has never before been employed in this establishment, or (2) former employees you did *not* call back. Former employees you *did* call back should be included in total accessions and "other accessions," but not in "new hires." Persons transferred from other establishments of this company should be reported in "other accessions."

Column 11. **OTHER ACCESSIONS.**—Include all additions to the employment roll other than new hires. This includes all employees called back to work by the employer from a layoff as defined for col. 7, transfers from other establishments of the company, and former employees returning from military leave or other absences without pay *who have been counted as separations.* Employees involved in labor-management disputes should not be counted as accessions when they return to work.

II. EMPLOYMENT

PERIOD COVERED.—Employment information, col. 12, is requested for one pay period (preferably one week) which includes the 12th of the calendar month for which labor turnover data are reported.

Column 12. **ALL EMPLOYEES.**—Enter the total number of persons (both sexes) on the payrolls of the establishment (s) covered in this report who worked full- or part-time or received pay for any part of the pay period (preferably one week). Include salaried officers of corporations, executives and their staffs, and employees engaged in a force-account construction but exclude proprietors, members of unincorporated firms, and unpaid family workers. Include persons on vacations and sick leave for which they received pay directly from your firm for the pay period covered but *exclude* persons on leave without company pay the entire period and pensioners and members of the Armed Forces carried on the rolls but not working during the pay period covered.

NOTE: If the number differs from the "All Employees" total reported on the Employment, Payroll, and Hours form, explain under Comments.

III. JOB OPENINGS

PERIOD COVERED.—Job openings information, columns 13, 14 and 15, is requested as of close of last business day (or nearest possible day) of the most recent monthly period for which labor turnover data are reported.

Column 13. **NUMBER OF CURRENT JOB OPENINGS (VACANCIES).**—Enter the number of current job openings in your establishment. IF "NONE," ENTER "0." A current job opening is an existing vacant job in your establishment that is immediately available for filling and for which your firm is actively trying to find or recruit some worker from outside your firm (i.e., a "new" worker—not a company employee).

Include such openings for all kinds of positions, classifications and employment (full-time, part-time, permanent, temporary, seasonal), including those outstanding on orders with employment agencies and notifications to unions.

Exclude jobs to be filled by recall, transfer, promotion, demotion or return from paid or unpaid leave; jobs unoccupied because of labor-management disputes; job openings for which "new" workers were already hired and scheduled to start work later; and the "openings with future starting dates" reported in column 15.

"Actively trying to find or recruit" means current efforts to fill the job opening through orders listed with public or private employment agencies and school placement offices; notifications to labor unions and professional organizations; "help wanted" advertising (newspaper, posted notice, etc.); recruitment programs; interview and selection of applicants.

Column 14. **CURRENT JOB OPENINGS CONTINUING UNFILLED FOR 30 DAYS OR MORE.**—Enter the number of current job openings included in the figure reported in column 13 which have continued unfilled for 30 days or more. IF "NONE," ENTER "0."

Column 15. **OPENINGS WITH FUTURE STARTING DATES.**—Enter the number of openings in your establishment for which your firm is actively trying to find or recruit some worker from outside your firm (i.e., a "new" worker), but which relate to jobs that are currently occupied or unavailable for immediate occupancy by "new" workers for such reasons as: job unavailable until expected separation of present incumbent occurs: work will not start until some future date; new branch to be opened in future or anticipated increase in business. IF "NONE," ENTER "0."

NOTE: OPENINGS WITH FUTURE STARTING DATES ARE NOT TO BE INCLUDED IN COLUMN 13.

IV. COMMENTS

Column 17. **YOUR COMMENTS.**—Enter the main factors responsible for significant month-to-month changes in Labor Turnover (cols. 4 through 11), Employment (col. 12), and Openings (cols. 13 through 15). Some examples are listed in the heading of column 17.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1970-0-407-201

gram, since full coverage would be prohibitively costly and time consuming. The sampling plan for the program must: (a) provide the preparation of reliable monthly estimates of job vacancy and labor turnover rates which can be published promptly and regularly; (b) through a single general system, yield considerable industry detail for metropolitan areas, States, and the Nation; and (c) be appropriate for the existing framework of operating procedures, administrative practices, resource availability, and other institutional characteristics of the program.

In developing the sample design, the universe of establishments was stratified first by industry and within each industry by size of establishment in terms of employment. Within each industry, an optimum allocation design was obtained by sampling with probability proportionate to average size of employment within each of the strata. The total size of sample regarded as necessary to produce satisfactory estimates of employment was distributed among the size cells on the basis of average employment per establishment in each cell. In practice, this is equivalent to distributing the predetermined total number of establishments required in the sample among the cells on the basis of the ratio of employment in each cell to total employment in the industry. Within each stratum, the sample members are selected at random.

Under this type of design, large establishments fall into the sample with certainty. Establishments with 250 or more employees are included in the sample with certainty, although in some cases the cutoff is lower. The sizes of the samples for various industries were determined empirically on the basis of experience.

The sample design, although aimed primarily at meeting the needs of the national program, provides a technical framework within which State and area sample designs can be determined. Since, however, the rates for States and areas are not generally prepared at the same degree of industry detail as the national rates, the national design usually provides sufficient reports for the preparation of State and area rates.[1]

Estimating Procedures

Both job vacancy and labor turnover rates are estimates of ratios. For individual industries, turnover rates are computed by dividing the number of turnover actions of each type, as reported by the sample establishments, by the total number of employees reported by those establishments. The result is multiplied by 100. In an industry sample, for example, 623 employees quit between January 1 and 31, while 30,062 employees worked or received pay during the week of January 11–17. The January quit rate for the industry is:

$$\frac{623}{30,062} \times 100 = 2.1$$

Turnover rates for industry groups are computed by weighting the rates for the component industries by the estimates of total employment, prepared by the BLS industry employment statistics program. These estimates, which cover the pay period including the 12th of the month, are described in chapter 2 of this bulletin. Rates for "all manufacturing" and for the durable and nondurable goods subdivisions of manufacturing are weighted by employment in the major industry groups.

Computation of job vacancy rates for industry stratum also involves a weighting process. The number of vacancies reported by the sample of establishments is weighted by the estimates of total employment in that industry stratum. The weighted number of vacancies is then divided by the sum of employment in the stratum plus vacancies; the quotient is then multiplied by 100 to determine the vacancy rate. Rates for major industry groups, for the durable goods and nondurable goods subdivisions, and for total manufacturing are computed by summing the weighted number of vacancies in the component cells of industries or subdivisions, then dividing by the sum of vacancies and employment in that industry, subdivision or division. Again, the quotient is multiplied by 100 to obtain the rate.

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[1] For the national sample, additional reports needed for State and area samples are added to those required by the national design.

As of 1971, size stratification was not used in the preparation of job vacancy and labor turnover rates. Tests were underway to determine the effect on the rates of introducing size stratification. Preliminary results of the tests suggested that size stratification would improve the labor turnover rates but have little effect on the job vacancy rates. Upon completion of the tests, size stratification will be introduced, if warranted.

Seasonally Adjusted Series

Many economic statistics, including labor turnover rates, reflect a regularly recurring seasonal movement which can be measured on the basis of past experience. By eliminating that part of the change which can be ascribed to usual seasonal variation, it is possible to observe the cyclical and other nonseasonal movements in these series. Seasonally adjusted labor turnover rates are published at the all manufacturing industry level.

The seasonal adjustment method used for these series is an adaptation of the standard ratio-to-moving average method, with a provision for "moving" adjustment factors to take account of changing seasonal patterns. A detailed description of the basic method is given in appendix A of this bulletin.

The 2 years of experience with job vacancy data indicate the emergence of some probable seasonal patterns. However, a minimum of 3 years of data are needed to develop estimates of the seasonal factors.

Presentation

The BLS publishes, on a national basis, monthly series of labor turnover rates for selected industries. These series are currently published for the manufacturing division, the durable and nondurable goods subdivisions, 21 major industry groups in manufacturing, 191 individual manufacturing industries, and 7 categories in mining and communications. Rates are available for all manufacturing from January 1930 and for telephone and telegraph from 1943. For industry groups and individual industries in the manufacturing and mining divisions, all series begin with January 1958. Rates for certain highly seasonal industries, for example canning and preserving, are not now published separately but are included in the computation of rates for the major manufacturing groups. Before 1958, these industries and the printing, publishing and allied industries major group were not included in the rates for all manufacturing. The rates for all manufacturing for years prior to 1958 were revised, however, to reflect the influence of these industries.

Monthly rates for total accessions, new hires, total separations, quits, and layoffs are shown for manufacturing and mining industries. Except for the new hire rates, the same items are published for the telephone and telegraph industries.

On a national basis, the BLS presently publishes monthly estimates of total and long-term job vacancies for the manufacturing division, the durable goods and nondurable goods subdivisions, and nine selected industry groups. Rates are available from April 1969 for each of these divisions and industry groups.

Preliminary job vacancy rates for the nine selected major industry groups and turnover rates for the 21 major industry groups in manufacturing are published monthly in a BLS press release about a month after the reference month, and in the *Monthly Labor Review* 3 months after the reference month. Preliminary turnover rates for both detailed industries and broad categories and preliminary job vacancy rates for the same categories as are included in the press release are published in *Employment and Earnings* about 2 months after the month of reference.

Both job vacancy and labor turnover rates for all manufacturing for selected States and metropolitan areas are published each month in *Employment and Earnings*. More detailed information is available in releases issued by the cooperating State agencies.

National labor turnover rates (monthly data and annual averages) back to the beginning of each series are published in the annual volume called *Employment and Earnings, United States*. New editions of this volume are published annually, following each adjustment of the Bureau's industry employment statistics series to new benchmark levels.

Uses and Limitations

The two major causes of change in both job vacancy and labor turnover rates are industrial expansion and contraction. In prosperous times, job vacancy rates, quit rates, and new hires are high because of job availability; in periods of economic recession, high layoff rates are coupled with low vacancy, quit, and accession rates. Turnover rates are, therefore, regarded as good economic indicators and are widely used by economic analysts in both government and private industry. Together with the turnover data and other labor force data, such as unemployment rates, job vacancy data are also expected to provide an indicator as to the condition of the economy.

Labor turnover rates by industry are also valuable for personnel planning and analysis. Employers use these rates as a yardstick against which to measure the performance of their plants. For example, they consider low quit rates to be an indication of efficient operations and good labor-management relations. A consideration of turnover is essential for scheduling production and for planning the orderly recruitment and maintenance of an adequate manpower supply. Labor turnover rates are also widely used by State employment services to plan and appraise their operations.

Job vacancy data should also prove useful to State employment services. By identifying emerging labor shortages, vacancy data will allow for more intelligent planning of training programs and should be useful in counselling the unemployed and new entrants to the labor market. The data may also make interarea recruitment of workers possible.

The use of turnover or job vacancy rates to interpret changes in the BLS monthly employment series is limited for the following reasons: (1) The labor turnover series measures changes during the calendar month, while the employment series measures changes from midmonth to midmonth; and (2) employees on strike are not counted as turnover actions, although such employees are excluded from the employment estimates if the work stoppage lasts throughout the report period including the 12th of the month.

The Bureau publishes annual averages of job vacancy and labor turnover rates, which are computed as the arithmetic means of the 12 monthly rates. These can provide a useful measure if a 1-month rate is not suitable for some purposes, as for example when the rate for a specific month is considered to be unusual or affected strongly by seasonal influences.[2]

—SHEILA C. WHITE

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[2] Because they are liable to misinterpretation, the Bureau does not prepare cumulative annual rates of labor turnover. For example, an annual quit rate could be obtained by dividing the total number of quits during the year by average employment during the year. An approximation of this figure can be obtained by cumulating the 12 monthly rates. Suppose the annual rate thus obtained amounted to 50 per 100 employees. This might seem to imply that 50 percent of all employees in January voluntarily left their jobs by the end of December. However, many jobs in a given establishment are vacated and refilled more than once during the year. The Bureau does not have information on the number of employees who remained with the establishment during the entire year. Over short periods of time, labor turnover rates probably include relatively little repetitive counting of employees who have held the same jobs, while over a period of as long as a year there is considerable duplication.

Manpower Structure and Trends

Chapter 4. Employment of Scientific and Technical Personnel

Background

The growth in industrial employment of scientists and engineers has been both a symptom and a driving force in the rapid technological progress of American industry. For a number of years, a major element in this growth has been the need of the Federal Government for increasingly complex and technologically advanced national defense material and space related research and technology. The surveys of scientific and technical personnel provide a means for estimating current manpower resources and a basis for evaluating future requirements for scientific and engineering personnel.

The surveys of scientific and technical personnel were initiated by the Bureau of Labor Statistics in 1959, under the sponsorship of the National Science Foundation. They are part of a comprehensive statistical program, coordinated by the Foundation, designed to yield estimates of the employment of scientists and engineers in all sectors of the U.S. economy. The Bureau of Labor Statistics conducted surveys of scientific and technical personnel in industry annually during the 1960's (except for 1965) and related surveys of State government agencies less frequently. Since 1962, the Bureau of Labor Statistics has had full responsibility for the conduct and publication of these surveys, which continue to be planned in consultation with the National Science Foundation. The last survey of scientific and technical personnel was conducted in 1970. In the future, estimates of scientific and technical personnel employed in private industry will be developed as part of the Bureau's Occupational Employment Statistics Program, which will provide employment statistics on all occupational fields.

Description of Surveys

The surveys of scientific and technical personnel in industry gather data on the employment of engineers as a group, and on scientists and technicians by major occupational specialty. Engineers and scientists are further distributed according to whether they are engaged primarily in research and development activities, in management and administration, in technical sales and service, in production and operations, or in "all other" functions. Data are published separately for all major industry groups, and in finer industry detail for a selected number of major industry groups. Beginning in 1966, data were developed by geographic area.

State agencies are surveyed for information on employment of engineers, scientists, technicians, economists, statisticians, psychologists, social workers, and health professionals. Employment is tabulated by the various governmental functions in which the workers are engaged. Data also are published by State when appropriate.

For each professional occupation, respondents are asked to report the number of persons whose current positions require knowledge equivalent at least to that acquired through completion of a 4-year college course with an appropriate academic major, regardless of whether they hold a college degree. These surveys, thus, cover all persons actually working in one of the designated occupations, specifically including those who do not hold an appropriate degree or any degree at all, but specifically excluding persons trained in the occupation but currently employed in positions not requiring the use of such training.

Technicians are defined as persons actually engaged in technical work at a level which requires knowledge of engineering, mathematical, physical and life sciences, comparable to that acquired through technical institutes, junior colleges, or other formal post-high school training less extensive than 4-year college training, or through equivalent on-the-job training or experience.

Data Sources

Sources of occupational data reported by respondents are personnel records and especially for the small reporting units, personal knowledge of persons completing the reports. Discussions with a number of large respondents indicate that their records typically contain much of the data in the desired form, but that some adjustments by the respondent are often necessary because the occupational classifications used in his records differ somewhat from those specified for the surveys.

Employment benchmarks for the survey of scientific and technical personnel in industry are derived from employment data tabulated from the first quarter reports of the unemployment insurance program. The survey of State government agencies is based on a compilation of data from all State government agencies employing personnel in occupations covered by the survey.

Collection Methods

Data are collected from respondents primarily by mail, but personal visits are made to many large employers, and to other respondents who indicate particular difficulty in completing the questionnaires. These visits, which limited resources have prevented from being either numerous or frequent, are carried out by senior staff members. Normally two mailings follow and a sub-sample of residual nonrespondents are contacted further by telephone.

The response to these surveys has been very encouraging. Respondents supplying usable information have constituted approximately 80 percent of the reports solicited in virtually every year, and have never been below 75 percent.

Sampling

The basic sample for the industry survey was drawn from lists of establishments reporting to each of the 51 (State and D.C.) employment security agencies for unemployment insurance (UI) purposes, and was supplemented by a list of interstate railroads and related companies supplied by the Interstate Commerce Commission. Industry classification of establishments is based on information available to the State agencies.

Certain categories of establishments are eliminated from the master list before the sample is selected, either because a separate survey of the given category is being made or because the number of scientific and technical personnel employed are believed to be negligible. The categories of organizations omitted are those classified according to the Standard Industrial Classification system in the following major industry groups: 01 and 02—farms; 80—medical and other health services (except 807, medical and dental laboratories, which is included); 82—educational services; 84—museums, art galleries, and botanical and zoological gardens; 86—nonprofit membership organizations; 88—private households; 89—miscellaneous services (except 8911, engineering and architectural service, which is included); 91 through 94—government; and 99—nonclassifiable establishments.

Establishments below a specified minimum size, determined separately for each industry group, are also excluded from the listing prior to sampling. Because of the large number of establishments in the small size groups, minimum size cutoffs are essential to the efficiency of the survey. Since excluded establishments employ very few scientists, engineers, or technicians, survey results are affected little by these omissions.

Sample numbers are allocated among the various industry-size strata according to the principle of optimum allocation; expected response rates by industry and by size are taken into account to obtain maximum reliability within available resources. The overall sample size is determined so that the variance (two relative standard errors) for the estimate of the total number of scientists and engineers for all industries combined is about 5 percent. In every covered industry, all establishments with 1,000 employees or more are included in the sample. In other industry-size cells, the sampling ratios range from 1 in 1 to 1 in 100. In general, the larger the establishment and the greater the number of technical personnel used by the industry, the higher is the sampling ratio. All selections are made randomly within the designated strata.

Since scientific and engineering employment is concentrated to a significant degree in research and development laboratories, not separately identifiable in the UI universe, the probability sample was supplemented. The essential rule for unbiased supplementation is that the supplementary units must be drawn independently of the probability sample; that is, the chance that a unit is drawn in the probability sample must be independent of the chance that the unit is selected as a supplement. The initial supplementation was drawn from a list of industrial research laboratories compiled by the National Academy of Science—National Research Council and from a list of small business concerns interested in performing research and development compiled by the Small Business Administration. Beginning in 1966, when a new sample was drawn, supplementation was achieved by retaining in the mailing list all establishments which reported employment of 20 or more scientists and engineers in surveys based on the previous sample. Establishments selected as supplements are tabulated as a separate cell within their industry and size class with a weight of 1, regardless of whether they are also members of the probability sample. (See Estimating Procedures.)

The mailing list for State government surveys is not a sample, but includes all agencies of State governments which could conceivably employ personnel in any of the designated occupations. The agencies are identified from information in directories and other documents furnished by the States.

Estimating Procedures

For the survey of scientific and technical personnel in industry, estimates are obtained for probability cells as the ratio of primary item employment to total employment (of the reporting units in the cell), multiplied by a total employment figure in that industry and size class that is adjusted for any supplemental units in that industry and size class to prevent duplicate estimation for supplemental units.[1] Estimates for supplemental cells are obtained by summing the primary item employment for the supplemental reports plus an estimate for nonrespondent supplementary units.

Estimates for the survey of scientific and technical personnel employed by State government agencies are obtained by summing the reported data. The response rate in this survey is extraordinarily high—96 to 98 percent—and examination of the nonrespondents shows that the number of scientists, engineers, and other personnel employed by them is negligible.

Analysis, Interpretation, and Presentation

A report on the findings of each survey is published, usually within 2 years of the reference date of the survey. Each report consists of an analytical interpretation of the findings, and is supported by a statistical appendix containing in tabular form all of the data that can be meaningfully derived from the survey.

Uses and Limitations

Data from these surveys form the essential statistical base (1) for evaluating the adequacy of scientific and technical manpower resources of the United States in light of current or projected demands and (2) for determining the rate of growth of these resources. They have been used to evaluate the impact of new or enlarged Federal programs calling for substantial scientific and technical manpower. These data also provide the bases for projections of future manpower requirements in science and engineering. For example, data are furnished for occupational guidance counselors and others who provide young people with information on which to base a choice of career.

These estimates must be interpreted as approximations. All surveys are subject to possible response and processing errors, although these are reduced insofar as possible, through checking procedures and through correspondence with reporters whose data are internally inconsistent or appear to involve misinterpretations of definitions or other instructions. In addition, estimates derived from sample surveys are limited by sampling error.

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[1] Symbolically, $P'=\frac{\Sigma p_i}{\Sigma e_i}M$, where M is the cell universe total employment, Σp_i is the sum of the primary item employment of the cell respondents, Σe_i is the sum of total employment of the cell repsondents, and P' is the estimate. M is adjusted to prevent duplicate estimation for supplemental sample reporters.

Technical References

Number

1. U.S. Department of Labor, Bureau of Labor Statistics. *Scientific and Technical Personnel In Industry, 1961–66* (Bulletin 1609, 1968).
2. ——— *Scientific and Technical Personnel in Industry, 1967* (Bulletin 1674, 1970).
3. ——— *Employment of Scientific, Professional, and Technical Personnel In State Governments, January 1964* (Bulletin 1557, 1967).
4. ——— "Scientific and Professional Employment By State Governments" (Reprinted from the August 1969 issue of the *Monthly Labor Rview.*)
5. ——— *Employment of Scientific and Technical Personnel in State Government Agencies* (BLS Bulletin 1412, 1964).
6. National Science Foundation, *Employment of Scientific and Technical Personnel in State Government Agencies, Report on a 1959 Survey.* NSF 61–17 (1961).
7. ——— Reports prepared for the National Science Foundation by the U.S. Department of Labor, Bureau of Labor Statistics: National Science Foundation, *Scientific and Technical Personnel in American Industry, Report on a 1959 Survey.* NSF 60–62 (1960).
8. ——— National Science Foundation, *Scientific and Technical Personnel in Industry, 1960.* NSF 61–75 (1961).
9. ——— National Science Foundation, *Scientific and Technical Personnel in Industry, 1961.* NSF 63–32 (1963).

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Chapter 5. Occupational Outlook

Background

The occupational outlook program originally stemmed from a report of the Advisory Committee on Education appointed by President Roosevelt. This Advisory Committee recommended, in 1938, that an occupational outlook service be set up in the Bureau of Labor Statistics to make studies and provide information for use of individuals in choosing a career, and for the use of those responsible for the planning of education and training programs. In 1941, the Occupational Outlook Service was organized under a specific authorization by the Congress. Although the first, preliminary studies were begun in 1941, it was not until after World War II that the occupational outlook staff was able to devote its efforts to the preparation of occupational reports for use in guidance. In mid-1946, a manual of occupational outlook information was prepared for use in the Veterans Administration (VA) counseling and rehabilitation program.

In response to a resolution by the National Vocational Guidance Association, calling upon the Congress to authorize this type of information for sale, and to requests by other private individuals and groups, the first edition of the *Occupational Outlook Handbook* was published in 1949. The favorable public response to the *Handbook* was a major factor in the Bureau's decision to issue, with the backing of the VA, a revised and enlarged edition, which was released in 1951.

Following the conclusion of the Korean hostilities, there was a sharp increase in public recognition of the key role of vocational guidance in staffing essential occupations and effectively utilizing the Nation's manpower resources. This resulted in the Congress in 1955 providng for the mainteance of the *Occupational Outlook Handbook* and its related publications on a regular, continuing, up-to-date basis. In 1957, the third edition of the *Occupational Outlook Handbook* was published; also in that year, the *Occupational Outlook Quarterly* was originated as a companion piece to the *Handbook*. The 1957 *Handbook* was followed in due course by the 1959, 1961, 1963–64, 1966–67, 1968–69, and 1970–71 editions of the *Handbook*.

Description of Program

Under the occupational outlook program, the Bureau of Labor Statistics conducts research in, and provides information on, future occupational and industry manpower requirements and resources. It provides vocational guidance information on expected employment opportunities for the use of counselors, educators, and others helping young people in choosing a field of work. It also provides manpower information for local and national training authorities and policymakers for use in developing programs of education and training. The results of the research are published in the *Occupational Outlook Handbook*, the *Occupational Outlook Quarterly*, and special bulletins, reports, and pamphlets.

In its 2½ decades of industry and occupational research, the occupational outlook program has systematically accumulated and analyzed considerable manpower information on such topics as employment trends for major industries of the economy and for most major occupations; employment effects of a great many long-term programs of government agencies, including those for defense, highways, scientific research, space technology, medical care, and education; and changes in industry and occupational requirements.

Toward providing an overall framework of future manpower requirements for the economy as a whole, projections are developed for the broad industry and occupational groups, and have been published regularly.[1] Every other year, hundreds of different, detailed occupational and industry statements are published in the *Occupational Outlook Handbook.* In most of these occupational outlook statements, information is provided on: nature of work; places of employment, education and training requirements; employment outlook for about 10 years ahead, including, in most cases, estimates of annual requirements for growth and replacement needs; and earnings and working conditions. In presenting outlook statements for industries, information is included on nature and location of each industry and other industry characteristics, as well as information on the industry's major occupations.

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[1] "America's Industrial and Occupational Manpower Requirements, 1964–75," prepared for the National Commission on Technology, Automation, and Economic Progress, published in *Technology and the American Economy*, Appendix Vol. I, February 1966, and The U.S. Economy in 1980, (BLS Bulletin 1673, 1970).

In presenting the employment outlook for an occupation, information is provided not only on the demand for workers but also on the potential supply of workers from many sources—schools and other training institutions, transfers from other occupations, and reentries to the labor force. The balance between supply and demand, in those occupations for which an assessment is possible, gives some indication of the nature of job competition in a specific field facing young people in the years ahead.

In addition to the overall and detailed industry and occupational projections developed for the *Handbook* and described earlier, special manpower studies are prepared, as part of the occupational outlook program, that provide information, narrower in scope and greater in depth, on the changing industrial structure and occupational composition of American industries, such as railroads, civil aviation, and electronics.[2] Other special studies provide more technical information and quantitative projections of manpower requirements and resources in specific occupations, industries, or for specific groups of workers—such as teachers, technicians and nonwhite workers—which include consideration of the current and future demand-supply relationships and their implications.[3] Still others discuss only manpower requirements trends and projections, especially in those occupational groups where the supply of workers is difficult to estimate, such as skilled workers and workers in defense-related employment.[4]

Sources of Data

The projections and other manpower information developed in the occupational outlook program utilize a wide variety of data sources, which vary mainly with the particular occupation or industry under examination. The following sections indicate some of the major sources of statistical and other information utilized in the program.

The basic statistics on current and past employment in occupations and industries have been based mainly on Bureau of Labor Statistics household data from the *Monthly Report on the Labor Force* (MRLF) and establishment data from *Employment and Earnings.* (A single publication starting with the February 1966 issue). Use is made also of the scientific and technical personnel surveys conducted by the Bureau, which contain data on scientists, engineers, and technicians. The decennial Census of Population is utilized for data on most occupations not covered by the limited detail published in the MRLF and Censuses of Business and Manufacturing are used to fill in industry detail. Information from the Civil Service Commission is used for data on Federal Government workers. These basic sources of occupational and industry employment statistics are augmented by data from Federal regulatory agencies, such as the Federal Aviation Agency and Interstate Commerce Commission.

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[2] *Employment and Changing Occupational Patterns in the Railroad Industry, 1947–60* BLS Bulletin 1344 (1963); *Employment Requirements and Changing Occupational Structure in Civil Aviation* BLS Bulletin 1367 (1964); and *Employment Outlook and Changing Occupational Structure in Electronics Manufacturing* BLS Bulletin 1363 (1963).

[3] Maxine G. Stewart, "A New Look at Manpower Needs in Teaching," *Monthly Labor Review,* June 1964, pp. 639–644; *Technician Manpower: Requirements, Resources, and Training Needs* BLS Bulletin 1512 (1966); Joe L. Russell, "Changing Patterns in Employment of Nonwhite Workers," *Monthly Labor Review,* May 1966, pp. 503–509; "Job Hopes High for Record College Class," U.S. Department of Labor, Press Release, June 5, 1966 (USDL 7246), and *College Educated Workers, 1968–80,* BLS Bulletin 1676 (1970).

[4] Allan F. Salt, "Estimated Need for Skilled Workers, 1965–75." *Monthly Labor Review,* April 1966, pp. 365–371; Joseph F. Fulton, "Employment Impact of Changing Defense Programs," *Monthly Labor Review,* May 1964, pp. 508–516; Bernard Yabroff, "Trends and Outlook for Government Employment," *Monthly Labor Review,* March 1965, pp. 285–291, and Max Carey, "The Crafts—Five Million Opportunities," *Occupational Outlook Quarterly,* Spring 1971, pp. 2–11.

which collect industry and occupational statistics. In some cases, employment data are obtained from unions, industries, trade associations, and professional societies. In most cases, however, these general statistics serve only as a starting point for the development of the specific, current estimates needed for a particular report.

In developing analyses of past and projected changes in employment requirements—which will be described later—the outlook program utilizes statistics of output, hours of work, and output per man-hour. The major sources of the statistics used are Bureau of Labor Statistics studies of productivity and technological development, the Federal Reserve Board production indexes, and the U.S. Department of Commerce output data from the *Annual Survey of Manufactures* and the *Census of Manufactures*. Industry associations and unions also often provide similar types of data.

Estimates of the past and probable future supply of workers utilize entirely different sources of information. U.S. Office of Education data on enrollments and degrees in high school, post-secondary schools, and colleges and universities form a major component of the supply estimates. Bureau of Apprenticeship and Training statistics on apprenticeship, as well as information on company training programs, provided through company reports and personal interviews, provide other inputs into the supply estimates.

Special studies of various aspects of the supply of workers provide essential information for the development of the estimates and projections of supply. A few examples of these types of statistical source materials are occupational mobility studies (Bureau of Labor Statistics); Tables of Working Life (Bureau of Labor Statistics); followup studies of college graduates (National Science Foundation); and many other specific types of studies, often of a one-time nature. Earnings information, which appears in many of the outlook publications, is drawn primarily from wage and earnings surveys conducted by the Bureau of Labor Statistics, supplemented with additional information on many occupations from Federal regulatory agencies. Studies of union wage scales are also used. Information is also drawn from reports by the National Science Foundation, professional societies and other groups.

Filling in gaps in the various types of statistics used is information obtained from (1) personal interviews with employers or others closely associated with an industry or occupation; (2) reports and interviews with professional or trade associations and licensing agencies; (3) union publications and officials; and (4) periodicals, trade journals, annual reports, and so on.

Methods of Analysis

The projections of requirements and resources developed for the occupational outlook program require varying methods of analysis, usually because of differences in the factors affecting a particular occupation or industry, but also because of differences in the amount of data available for analysis. The broad pattern of research, however, is generally the same in all of the detailed, comprehensive occupational and industry studies.

The starting point in most studies is an analysis of the factors affecting the demand for workers in the occupation, and an assessment of how these factors may operate in the future. Occupational employment is affected by a host of factors. Technological change is the most often discussed factor affecting occupational employment, but occupational changes are also influenced by other factors, such as growth in population and its changing age distribution, as in the case of teachers. Government policy—relating, for example, to the magnitude of the defense and space programs and to expenditures for research and development—also plays a major role. Occupational employment is also influenced by institutional factors, such as union-management relationships and practices, as in the case of railroad workers, or by the relative supply of workers in other occupations, as for example, the substitution effect resulting from shortages of engineers and their replacement by technicians. Also influencing occupational employment are changes in the total demand for the employing firm's product; changes in the level of income and distribution of income among consumers, industry and government; and changing patterns of consumption.

It is apparent, in view of this multitude of factors, that no one technique can be used successfully to project manpower requirements in all occupation and industries. The growth and decline of each occupation is affected by its own complex of factors. The number of teachers required, for example, is affected by the number of pupils (related to birth rates and trends in the proportion of children at each age who attend school) and by trends in the ratio of teachers to pupils, which depend upon education practices and available financing.

Projections of requirements for scientists, engineers, and technicians require consideration of different factors. These must take into account such factors as the growing utilization of technical personnel, the increasing technological complexity of industrial products and processes, changes in levels of expenditures for defense, and growing research and development activities. Requirements for automobile mechanics are related to the number of new automobiles and accessories and the age of automobiles; for radio and TV repairmen, to the number of radios and TV's sold, and their age and complexity; for policemen, to population and urbanization; for truckdrivers, to improved equipment and highways, and for competing methods of transportation.

For many occupations, the significant factors influencing employment are the prospective levels of demand for the products of the various industries in which the occupation is found, and the effect of these changes in demand on employment in the industries. Among the general factors which must be considered in an analysis for an industry study are expected changes in the total domestic production of the industry's product or service, competition with other products or services, expected technological changes, output per man-hour, and changes in hours of work. More specifically, in projecting the activity or production level of an individual industry, it is necessary first to establish the nature of the demand for an industry's products or services and the relationship of this industry to the growth of the whole economy. Obviously, an industry producing products directly for consumers will have a different type of demand function than an industry which is making raw materials to be used as a component for further manufacturing.

In projecting the production of steel, for example, consideration must be given to the expected increase in population and the trend in steel output per capita. The total requirements for steel depend on the requirements projected for each of the principal steel-using industries, such as the automobile, construction, electrical appliances, machinery, and containers industries; competition to steel from other materials, such as aluminum and plastics; and the import-export balance for steel. In effect, it is necessary to project the output of both domestic and foreign users of steel in order to estimate total steel requirements. Future industry production or activity levels can then be translated into overall manpower requirements by estimating changes in man hours per unit of output for each industry, and by making assumptions as to changes in hours of work.

Because of the tremendous amount of resources necessary to make an extensive study of each industry in the economy, a more global type of analysis has been used to fill the gaps and to provide an overall framework for the occupational and industry projections. In making the analysis for the products of each industry, the usual starting point is the total demand of the economy for goods and services; this can be apportioned among the requirements for each major product or service (classified by industry). The estimates of production can then be translated into requirements for workers in total and by occupation.

The general approach in the development of this industry framework is to begin with the population and labor force projections developed by the Bureau of the Census and the Bureau of Labor Statistics. Assumptions are made as to the size of the Armed Forces, the level of unemployment, annual hours of work, and output per man-hour. Multiple correlations are made which take into account past employment trends and relationships, and variables such as unemployment, size of the Armed Forces, gross national product, and population. By this technique, preliminary projections of manpower requirements are developed for each industry for which adequate data are available.

The results of the multiple regression analysis are then used as the basis for further judgment decisions as to the level of manpower requirements in the projected period, particularly for those industries for which detailed industry studies have been made. The considerable amount of information on individual industries developed in the occupational outlook program over many years and through discussion with representatives of industry and unions provides essential background in making these judgments. Analysis of trends and projections for the economy as a whole, or for indivdiual industries made by other groups, such as the National Planning Association, Stanford Research Institute, State and local governments, and universities, also contribute to these judgments. The adjusted overall industry projection framework is then utilized as a basis for occupational requirements. These rough occupational projections are then analyzed and adjusted on the basis of the individual occupational studies previously described, both the detail and the control totals. (See description of Industry-Occupational Matrix, chapter 7.) In general, it may be said that the projections are based heavily on judgment as to the effect of the demand factors on specific occupations.

Projections of changes in manpower requirements by occupation and industry provide only one part of the information on the total number of job openings which will need to be filled in the years ahead. In most occupations, more workers are needed yearly to fill positions left vacant by those who leave the occupation to enter other occupations or because of retirement or death, than are needed to staff new positions created by growth of the field. In estimating the total number of openings likely to arise in an occupation, the occupational outlook program analyzes studies of occupational mobility among selected groups of workers, and tables of working life.

These tables of working life, which are similar to the actuarial tables of life expectancy used by insurance companies, provide a basis for assessing future rates of replacement resulting from deaths and retirements, which are in turn affected by differences in sex and average age of the workers in particular occupations. Where men comprise the great majority of workers, estimated replacement rates for death and retirement usually average between 1 and 3 percent a year. In occupations in which women predominate, the rate is usually much higher, and allowance must be made for the large numbers of women who leave paid employment to get married and assume family responsibilities but who return to paid employment after marriage or raising a family. The replacement rate among elementary school teachers, for example, is estimated at 4.8 percent a year; many of these teachers return to employment at a later date.

In appraising the overall employment opportunities in an occupation, estimates are also made of the future supply of personnel, at least in those fields in which the supply is identifiable. Statistics on high school and college enrollments and graduations are the chief sources of information on the potential supply of personnel in the professions and in occupations requiring extensive formal education. Data on numbers of apprentices and graduates of vocational and technical training programs provide some limited information on new entrants into skilled trades. However, in many occupations most new entrants are trained informally, through on-the-job training or company training programs.

It is not enough to know, of course, how many persons are being formally trained for an occupation, since not all those completing formal training or education in a particular field enter that field upon completion of their courses. As a result, special surveys are utilized to provide additional information on the actual net supply of workers from a training program or a field of study. These include studies of employment plans of college seniors, job placements of college graduates, and jobs entered after completion of MDTA and other types of training. Limited data on transfers out of an occupation or re-entries into an occupation are also utilized, although, in general, data on occupational mobility are available for only a few occupations.

The estimates of the future demand in an occupation is then related to estimates of the future supply to develop the employment outlook in that field and to provide information to policy makers, educators, and others on the implications of these relationships.

Presentation

The *Occupational Outlook Handbook* is the major publication of the occupational outlook program. Oriented toward vocational guidance, the *Handbook* is a basic reference source, published every other year, which includes comprehensive and non-technical job information on approximately 800 occupations and 30 major industries, covering the entire spectrum of white-collar, blue-collar, and service occupations. An occupational outlook report series provides reprints of individual statements from the *Handbook.*

The *Occupational Outlook Quarterly* provides a continuous flow of current occupational and job information between editions of the *Handbook,* together with the most recent information available on earnings, training requirements, and other related topics. In addition to these two publications, developed mainly for use in vocational guidance, the occupational outlook program conducts technical and detailed studies on specific occupations and industries in order to furnish information to manpower experts, personnel departments, and others interested in the more technical aspects of the Nation's future manpower needs.

—NEAL H. ROSENTHAL

Chapter 6. Projections of the Labor Force

Background and Uses

Projections of the future size of the labor force are needed for a variety of planning purposes. They provide a basis for establishing the amount of employment growth the economy must generate to maintain high levels of employment. They serve as the basis for one approach in setting goals for a general economic growth rate consistent with full utilization of human resources. Projections help to gain insight into the characteristics and numbers of workers who will be available for industry, and to see what this implies for education, training, and personnel policies. In addition, labor force projections, together with population projections, are used to estimate demand for products, develop marketing plans, and evaluate expansion programs. The U.S. Department of Labor is particularly concerned with the relationship between the expected labor supply and the need for various skills and training created by our changing technology.

Method

Projections of the labor force as a whole and of the separate age-sex groups are made for quinquennial dates usually for about 15 years ahead. The schedule for preparing the projections has been irregular owing, in part, to the timing of new projections of the population of working age. Labor force projections for 1975, 1980, and 1985 were published in May 1970.

Because social and economic factors affect the supply of labor, certain assumptions need to be made about conditions surrounding any set of labor force projections. Generally, projections have been made on the basic assumptions that past trends in labor force participation would continue into the future, and that the economy would continue to expand and maintain high levels of employment opportunity consistent with an unemployment rate of about 4 percent. Another usual assumption is that there would be no major war or significant change in the size of the Armed Forces which might substantially alter the previous work patterns of the population. It also presupposes that the trend toward increased school enrollment beyond the high school level, which has a direct bearing on labor force activity of young persons, would continue, supported by adequate school facilities, staff, and aid to students.

The general approach used in preparing the Bureau's labor force projections is to project the proportion of the population in each age-sex group or subgroup that is expected to be in the labor force, i.e., the labor force participation rate at the specified future date, and to apply these rates to the expected population in each group.

In making projections for a given age-sex group or its subgroup, the standard procedure is to fit a line or curve to a series of points representing the labor force participation rates for that group for the years since 1947, and to extrapolate the line or curve into the period covered by the projection. The procedure is modified, as appropriate, to discount the temporary effect of factors judged to be operative for only short periods.

The population projections used in projecting the labor force are prepared by the Bureau of the Census on the basis of analyzing past trends in birth rates, death rates, and net immigration and projecting these trends. Since the birth rates pose the most uncertainty in projecting the population, the Bureau of the Census prepares several series of population projections on the basis of varying assumptions with respect to birth rates. The uncertainty of projecting birth rates does not directly affect the level of the labor force projections 15 years ahead, since everyone of working age (16 years and over) at that future date has already been born when the projections are made. However, the birth rates do have a bearing on projections of the labor force participation rates of younger married women, because mothers of young children are less likely to work. Because of this indirect effect, it was necessary to select the one series of population projections which seemed most reasonable on the basis of an independent evaluation of past trends in birth rates. For recent labor force projections, series "C" of the population projections published in the Census Bureau's *Current Population Reports*, P-25, No. 381 was chosen.

The overall size of the labor force is built up by age and sex, not only because the composition is needed for many of the purposes noted earlier, but also because the degree of labor force participation varies among the different age-sex groups, and the historical trends in these rates also vary. Some of the factors which help to explain the behavior of the labor force participation rates and which affect particular groups include school attendance, marital status, birth rates, and the availability of social security benefits and the expansion of private pension plans. The method of projecting the labor force participation rates for the various age-sex groups takes into account the influence of a number of these specific demographic and social factors. For example, projections of the proportion of persons enrolled in schools in the various young ages are used to subdivide the future population of young persons into those who are expected to be in school and those not in school. The population of married women in ages 20 to 44, by age, is grouped by those who are expected to have children of preschool age and those with no children under 5, on the basis of projected trends in fertility and child spacing. Similarly, projected marital status distributions of older adult women are used to provide the future numbers in each marital category within each age.

For each of these subgroups, the projected labor force participation rates are applied to their respective future populations and the resulting labor force summed to provide the total labor force for each age-sex group and for all ages.

Sources of Data

The source of the basic historical data on labor force participation rates by age and sex used to project the labor force is the monthly statistics on the labor force. These are published by the Bureau of Labor Statistics and are based on the Current Population Survey of the Bureau of the Census. Historical data on labor force activity by various categories within several of the age-sex groups are obtained from the recurring supplementary labor force surveys also based on the Current Population Survey. These include information from the October surveys of the employment of school-age youth and the March surveys of the marital and family characateristics of workers.

The population projections are the latest available projections made by the Bureau of the Census and published in their *Current Population Reports*, Series P-25. Projections of school enrollment and marital status, by age, are based on published and unpublished data of the Bureau of the Census. Data used in projecting the proportion of women in each age group who will have children under age 5 years include published and unpublished data on birth rates, by age of mother and order of birth, from the Division of Vital Statistics of the Public Health Service; fertility and marriage data from reports of the Bureau of the Census, *Current Population Reports*, Series P-20, and data from the decennial censuses of population.

Technical References

Number

1. Travis, Sophia C., "The U.S. Labor Force: Projections to 1985," *Monthly Labor Review*, May 1970, pp. 3-12, reprinted as Special Labor Force Report No. 119.
2. Cooper, Sophia, and Denis F. Johnston, "Labor Force Projections for 1970-80," *Monthly Labor Review*, February 1965, pp. 129-140, reprinted as Special Labor Force Report No. 49.
3. *Population and Labor Force Projections for the U.S., 1960 to 1975* (BLS Bulletin 1242, 1959).

—SOPHIA COOPER TRAVIS

Chapter 7. Industry-Occupational Matrix

Background

The Bureau of Labor Statistics has developed a comprehensive set of data on the occupational employment composition of all industry sectors in the economy. Presently, industry-occupational matrices are available for 1960, 1967, 1970, 1975, and 1980. These data are set up to form a matrix, or table, of 162 specific occupations plus groupings of occupations cross-classified with 116 industries. Thus, the occupational pattern of each industry is shown—i.e., the proportion of each occupation to total employment in an industry. Looked at another way, the tabulation shows how total employment in an occupation is distributed by industry.

Initially, work on the Industry-Occupational Matrix grew out of concern by the Department of Defense for anticipating the economic problems that might arise from various defense programs. The first set of tables related to 1950 and were prepared by the Bureau as a part of the interindustry program of the early 1950's, sponsored by the U.S. Department of the Air Force. That program was terminated in 1953, but the 1950 matrix and its successors continue to provide the basic information for emergency manpower planning, now carried on by the Office of Emergency Preparedness. In recent years, a strong interest has developed in determining manpower needs for other purposes. The latter have included training new workers, retraining workers displaced by automation, and providing information to high school counselors and to students making career decisions. The change has focused increased attention on the need for estimates of numbers presently employed in specific occupations and the likely future employment requirements by occupation. The Industry-Occupational Matrix provides a systematic approach to developing the desired information.

Sources of Data

Data for the Industry-Occupational Matrices are brought together from a wide variety of sources. A major source for the development of the 1960 matrix was the *Occupation by Industry* report from the 1960 Census of Population. The Current Population Surveys (CPS) are the source for total employment, employment for broad occupational groups, and for a few large, specific occupations.[1] Other sources of occupational employment data included the Bureau of Labor Statistics annual surveys of occupational wage rates in metropolitan areas and selected industries;[2] regulatory agency statistics on employment by occupation in the telephone, railroad, and air transportation industries; U.S. Civil Service Commission statistics on employment by occupation in the Federal Government; statistics on selected professional occupations based on licensing data and membership records of professional societies; and surveys of employers by the Bureau and other agencies to obtain estimates of employment in a limited number of highly important occupations such as scientists, engineers,[3] teachers, and policemen.

Specific estimates from sources other than the Census were incorporated into the cells of the matrix for about 16 million workers, or one-fourth of all those who were employed in 1960. The remaining details in the matrix were derived by forcing 1960 population census estimates for detailed cells (published in *Occupation by Industry*) into agreement with control totals for occupational groups and industries from sources other than the Census. The occupational control totals were average annual employment by occupational group taken from the CPS. Most of the industry employment totals were based on BLS estimates of private wage-and-salary workers adjusted to include the self-employed, unpaid family workers, and government workers, and to exclude the secondary jobs of dual job holders. Total employment in agriculture and private households was based on CPS estimates. The adjustments of the matrix to consistency with CPS estimates of total employment and industry employment estimates, derived as described above, brings the matrix for 1960 into agreement with data used as the basis for the Bureau's projections of total employment and occupational employment by industry. The Bureau's occupational projections are reflected in and developed in part through matrix techniques. (See section on analysis and uses.) The 1975 matrix[4] was developed by examining a variety of historical statistics on the changing occupational structure of industries and data from the 1950 and 1960 censuses and evaluating the factors likely to influence changes in the future such as expected new technology, changes in product mix, and the general organization of industries. A similar procedure, together with use of information for the 1960–67 period, was used in preparing the 1980 matrix.

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[1] See chapter 1.

[2] See chapter 14.

[3] See chapter 4.

The 1960 matrix provided the base for the 1967 and 1970 matrices.[5] Where available, occupational data from other sources, such as those cited above, were incorporated into the updated matrices as fixed cells. For the remaining cells, first approximations of the occupational patterns for 1967 were made by interpolating between the patterns of the 1960 and the 1975 matrices. The resulting patterns (in mining and manufacturing) were then brought into consistency with data on production worker trends available from the Bureau's Current Employment Statistics program. The patterns were then applied to individual industry employment controls and summed up to arrive at occupational totals. These occupational control totals were then compared to data from the CPS and other sources of information. When necessary, certain occupations (except for fixed cells) were then forced on a prorated basis to predetermined occupational control levels. This iterative forcing procedure was repeated until the internal matrix cells were consistent with both the industry and the occupational controls. A similar procedure was followed in preparing the 1970 matrix with the exception that the 1967 matrix provided the basic data file of occupational ratios used for the iterative forcing procedure. Thus, both the 1967 and the 1970 industry-occupational matrices were consistent with (a) national employment by industry, (b) broad occupational employment levels from the CPS, (c) trends in production (and nonproduction) worker employment by industry, (d) anticipated trends in occupational structure within industries, and (e) reliable estimates of detailed occupational employment available from the CPS and other sources.

Analysis and Uses

A basic objective of the project is to have available a comprehensive set of data on industry-occupational relationships which can be used in projecting manpower requirements by occupation. Although statistics on employment by occupation are relatively thin, particularly between decennial censuses, there is a great deal of information on total employment in detailed industries. Each industry utilizes a unique combination of occupational skills, together with other factors of production, in its efforts to achieve least cost for its output. Occupational patterns may be markedly different from one industry to another. For example, employment in the insurance industry is primarily of white-collar workers such as insurance agents, office clerical workers, actuaries, and others. In contrast, the work force in restaurants is largely made up of waiters, waitresses, cooks, and owner-managers. Over periods as short as a decade, the occupational structure of many industries is relatively stable. Consequently, if good information is available on the occupational composition of individual industries for a base period, it can be used together with the available statistics on changing employment in each industry to develop estimates of current employment by occupation for later periods. Further, if projections of output and employment are available by industry, the base period occupational ratios applied to the industry employment projections will yield initial estimates of employment requirements by occupation for future periods.

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[4] For a detailed description of the procedures followed in developing the 1975 matrix, see *Occupational Employment Patterns, 1960 and 1975* (BLS Bulletin 1599, 1968).

[5] For a more complete discussion of the methods used in developing the 1967 and 1970 matrices, see *Occupational Employment Statistics 1960–67*, BLS Bulletin 1643.

Although the occupational patterns of many industries are relatively stable over periods of 5 to 10 years, it is clear that occupational patterns change with the advance of technology and changes in the supply of workers in each occupation. Hence, information on how technology and labor supply are changing the occupational pattern in each industry is used to modify the initial estimates. This improves the estimates of current employment by occupation and of future employment requirements by occupation, developed by applying base period industry-occupational ratios to industry employment estimates. Changing technology and other factors which affect skill requirements are constantly being studied in order to estimate the future occupational structure of each matrix industry. The adjusted occupational patterns are then used, together with projections of employment by industry, to prepare estimates of future employment requirements to 1980.

—RICHARD DEMPSEY

Prices and Living Conditions

Chapter 8. Consumer Expenditures and Income

Background

Consumer expenditure surveys[1] are specialized family living studies in which the primary emphasis is on collecting data relating to family expenditures for goods and services used in day-to-day living. Expenditure surveys of the Bureau of Labor Statistics also include information on the amount and sources of family income, on changes in savings or debts, and on major demographic and economic characteristics of family members.

The Bureau's studies of family living conditions rank among its oldest data-collecting functions. The purpose of the first nationwide expenditure survey in 1888–91,[2] in line with the legislation creating the Bureau, was to study the worker's consumption habits and living costs as elements of production costs, with special reference to competition in foreign trade. It emphasized the worker's role as a producer, rather than as a consumer. Purposes and coverage changed in successive surveys, and problems caused by rising prices led to the second survey, during the year 1901. The index of prices of food purchased by workingmen, with weights based on the 1901 data, was used generally as a deflator for workers' incomes and expenditures for all kinds of goods until World War I. The third major survey, spanning 1917–19, provided weights for computing a "cost-of-living" index, now known as the Consumer Price Index (CPI). (See chapter 10.) The next major study, for 1934–36, was made primarily to revise these index weights and covered only urban wage and clerical workers.

However, in the severe economic depression of the 1930's, interest in consumer surveys expanded from study of the welfare of selected groups to general economic analysis. Thus, almost simultaneously with its 1934–36 investigation, the Bureau cooperated with four other Federal agencies in a fifth survey, the Study of Consumer Purchases, in 1935–36, which undertook to show consumption of all segments of the population, both urban and rural.[3] The Bureau's sixth major survey, for 1950, covered all urban consumers. It provided the basis for revising the Consumer Price Index (CPI) and also supplied abundant material for broader types of economic and market analysis. The remainder of this chapter deals with the 1960–61 survey—the latest in the series[4] describing changes in the consumption habits of the American people.

Description of Survey

The basic orientation of the Bureau's most recent survey was to obtain detailed information for revising the CPI. The increasing need for consumer expenditure and income data for other purposes was taken into account in planning the survey of urban families in 1960 and 1961. Then, in cooperation with the U.S. Department of Agriculture (USDA), the 1961 coverage was extended to rural areas. Thus, for the first time since 1941, information on spending habits became available for a cross-section of the entire noninstitutional population in urban, rural nonfarm, and rural farm areas of the United States. Concepts, techniques, and publications for the 1960–61 survey were planned to provide as much continuity and comparability as possible with the Bureau's 1950 and earlier expenditure surveys.

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[1] In this chapter, the initials CES are used to refer to the program of consumer expenditure surveys.

[2] The State of Massachusetts conducted the first expenditure survey in the United States. This investigation of living conditions in 1874–75 undertook to measure the welfare of the workingman's family before and after migration to the United States. For a more detailed account of expenditure surveys in this country, see U.S. Bureau of the Census, *Historical Statistics of the United States—Colonial Times to 1957,* Chapter G (1960).

[3] The Bureau also cooperated with the U.S. Department of Agriculture in a smaller scale nationwide survey of urban and rural families in 1941–42 to obtain facts on which to base decisions for the civilian economy during wartime. In addition, the Bureau conducted a Survey of Prices Paid by Consumers in 1944 among a nationwide sample of urban families; as a byproduct of the reports required for the analysis of prices, certain data on family income, savings, and expenditures were obtained.

[4] In addition to these 7 major surveys, the Bureau has conducted a number of expenditure surveys in cities selected for specialized studies.

All data were collected through the voluntary cooperation of families.[5] The family, or consumer unit (CU), referred to (1) a group of people usually living together who pooled their income and drew from a common fund for their major items of expense,[6] or (2) a person whose income and expenditures were not pooled with others, whether living alone or in a household. However, never-married children living with parents always were considered as members of the parents' consumer unit.

Information was recorded for the family as composed in the survey year, including part-year members. Family members were not eligible for periods in the survey year that they lived in military camps, posts, or reservations; in institutions; abroad (except on vacation, etc.); or were members of another CU.[7]

A complete account of family income and outlays was compiled for a calendar year. This account included information to determine net changes in the family's assets and liabilities during the year. The estimated value of goods and services received as gifts or otherwise, without direct expenditures by the family, was requested also. To supplement the annual data, families who prepared meals at home provided a detailed 7-day record of expenditures for food and related items purchased frequently.

For selected items of clothing, housefurnishings, and food, the record of expenditures was supplemented by information on quantities purchased and prices paid. Characteristics of the housing occupied by homeowners and renters and an inventory of the major items of housefurnishings they owned were recorded.

To permit more meaningful analysis of the spending habits of American families, limited demographic information was obtained. This information included the sex, age, years of school completed, occupation, race, and marital status of each family member.

Data Sources and Collection Methods

All data were collected by personal interview. The BLS was responsible for collecting data from all residents of urban places. The BLS and USDA shared this responsibility in the rural areas of Standard Metropolitan Statistical Areas (SMSA's)[8] and the USDA had sole responsibility for interviewing rural households in nonmetropolitan areas.[9]

Field Organization

To reduce the size of the staff to be recruited and trained and to utilize this staff over a longer period, it was decided that the urban survey would cover 2 years, 1960 and 1961. For similar reasons, the surveys for each year were conducted in two "waves." As field work was completed in the largest SMSA's, supervisors were reassigned to smaller places. Interviews for the 1960 and 1961 CES were conducted in the spring and summer of 1961 and 1962, respectively.

The supervisory field personnel were recruited by the BLS Regional Offices[10] and brought to Washington for 6 weeks of intensive training on the purposes of the survey, survey techniques, and schedule content. These supervisors went to an assigned city where they, in turn, recruited interviewers, whom they trained for about 8 days.

Questionnaires

The detailed questionnaires used by the BLS agents in interviewing families in the 1960–61 survey had been tested in surveys for 1959 in three cities. They incorporated modifications based on this experience. Three forms were used in the nonfarm surveys. Schedule A was a two-page form to determine the family's eligibility for the survey and, for families who refused or were unable to participate in the survey, it provided a record of minimum data for the analysis of nonresponse. Schedule B, on which the interviewer entered the complete annual record of the family's living arrangements, income, spending, and changes in savings, consisted of 59 pages and formed the basic framework of the survey. Schedule C provided 15 pages for a detailed report of the family's purchases of food, beverages, tobacco, personal care, and household supplies in the week preceding the interview.[11] The coding system for summarizing and classifying the data was devised while the 1960–61 schedules were being designed, and tabulating codes were printed on the schedules. The precoded data were then readily transferred to punch cards and magnetic tapes for tabulating.

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[5] See discussion of bureauwide policy on voluntary reporting and confidentiality, under Introduction.

[6] This category includes children temporarily away from home at school or college.

[7] The tabulations published in the CES reports listed in the table at the end of this chapter include only full-year consumer units, i.e., units with at least one member who was eligible over the entire survey year. In addition, the Bureau obtained schedules from approximately 400 part-year CU's, for special analytical research.

[8] See appendix B for description of SMSA classification system.

[9] See discussion of sample design, p. 56.

[10] The following description refers to procedures of the BLS, but USDA procedures were similar.

Information in schedule B was grouped in 23 sections, placed in a sequence so as to establish and maintain rapport between the interviewer and the respondent. The detailed checklists of items [12] in each section were included not only to facilitate recall, but to provide the specific information needed to determine CPI weights. However, all sections were rarely applicable to a single family. For example, if the family were renters, the sections relating to homeownership could be omitted. Families were encouraged to refer to records whenever possible.

Reported receipts and disbursements were summarized and reviewed in the field to determine the completeness, consistency, and balance of the family account. Families were reinterviewed when the field supervisor deemed it necessary to clarify ambiguous entries or to complete a record.[13] On the average, the interviewer spent 7 to 8 hours with a family in a series of visits arranged at the family's convenience.

Sampling

Separate stratified samples were selected for urban areas, rural areas in metropolitan counties, and rural areas in nonmetropolitan counties. A three-stage sample design was used within each area to obtain a sample of consumer units representative of all U.S. consumer units as defined for this survey.

In developing urban sampling plans, continued representativeness of the sample for measuring national changes in consumer prices was of paramount importance. Consideration of probable resources led to setting 66 as the maximum number of cities for the CES sample. Tests of the effectiveness of some of the more obvious modes of stratification indicated that no elaborate stratification was justifiable for so small a sample of cities. In general, classifications by geographic region and size of city seemed to be most effective, especially since an important objective in selecting specific cities was to achieve good geographic dispersion. For this purpose, the BLS utilized the "controlled selection" procedure.[14] The primary sampling unit was the Standard Metropolitan Statistical Area (SMSA) in the metropolitan segment of the United States and the individual urban place in nonmetropolitan areas.

Sample Design for Three Urbanizations

In the first stage of the design for the *urban* sample, all SMSA's and nonmetropolitan urban places were classified by population size and region. A sample of 66 places listed in the table was selected to represent all urban places in the 50 States. All of the 12 largest areas in the United States automatically were included. For New York and Chicago, the Standard Consolidated Areas, rather than the constituent SMSA's, were used as primary sampling units. However, in the collection and analysis of the data, the New York–Northeastern New Jersey Standard Consolidated Area was divided into two subareas—New York, N.Y. and Northeastern New Jersey. All of these largest areas were surveyed in both years with data

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[11] A modification of schedule B, providing for detailed reporting of farm receipts, disbursements, changes in farm assets, and value of home-produced food, but otherwise paralleling the nonfarm schedule, was used by the U.S. Department of Agriculture in rural farm areas. Schedule C was not used in interviewing farm families.

[12] For a discussion of global versus detailed questions and "free-listing" versus "check-listing," see report by Helen Humes Lamale, *Methodology of the Survey of Consumer Expenditures in 1950*, Philadelphia, Pa., University of Pennsylvania, Wharton School of Finance, 1959, pp. 18–19.

[13] Prior to editing the schedules for machine tabulation, the schedules were reviewed in the Washington offices of the BLS and USDA primarily to determine that entries conformed to the survey concepts and methodology. This review was concentrated on sections of the schedule which had proved most difficult in previous surveys, and on unusual situations which required specialized instructions. Occasionally, schedules were returned to the field for clarification or additional information, and some schedules considered complete in the field were rejected in Washington. If a schedule met the test of the review and editing instructions with respect to internal completeness and consistency of expenditures with each other and the family's reported manner of living, the record was used even though there was a substantial lack of balance between the family's reported total receipts and disbursements.

[14] This procedure involves the probability selection of a sample "pattern" from a set of patterns purposively established so that, taken as a group, they give each primary sampling unit its proper chance of appearing in the final sample. The selection of the city sample is described in "Technical Note—The Revised City Sample for the Consumer Price Index," *Monthly Labor Review*, October 1960, pp. 1078–1083. (BLS Reprint 2352.)

SURVEY OF CONSUMER EXPENDITURES, 1960–61

(SUMMARY OF SAMPLE SIZE AND AVAILABILITY OF DATA FOR URBAN AND RURAL AREAS, BY GEOGRAPHIC REGION, POPULATION STRATUM, AND SMSA OR OTHER URBAN PLACE)

Region, population stratum, SMSA, or other urban place	Number of—		Survey year		Publications	
	Assignment addresses	Usable schedules	1960	1961	BLS report number	Supplements
Total urban and rural—United States	[1] 17,283	[1] 13,728	(*)	(*)	237-93	1, 2, 3
Northeast	4,127	3,228	(*)	(*)	237-89	1, 2, 3
North Central	5,187	4,092	(*)	(*)	237-90	1, 2, 3
South	5,100	4,180	(*)	(*)	237-91	1, 2, 3
West	[1] 2,869	[1] 2,228	(*)	(*)	237-92	1, 2, 3
Rural farm—United States	2,581	1,967	--------	(*)	(3)	(3)
Northeast	214	145	--------	(*)	(3)	(3)
North Central	980	742	--------	(*)	(3)	(3)
South	1,181	925	--------	(*)	(3)	(3)
West	206	155	--------	(*)	(3)	(3)
Rural nonfarm—United States	2,497	2,285	--------	(*)	237-88	1, 2, 3
Northeast	453	406	--------	(*)	237-84	1, 2, 3
North Central	702	628	--------	(*)	237-85	1, 2, 3
South	999	948	--------	(*)	237-86	1, 2, 3
West	343	303	--------	(*)	237-87	1, 2, 3
Urban—United States	[1] 12,205	[1] 9,476	(*)	(*)	237-38	1, 2, 3
Northeast	3,460	2,677	(*)	(*)	237-34	1, 2, 3
SMSA, population 1,400,000 and over						
Boston, Mass	375	268	(*)	(*)	237-7 and 57	[3] 1
New York, N.Y	625	448	(*)	(*)	237-4 and 54	[3] 1
Northeastern New Jersey	500	356	(*)	(*)	237-13 and 63	[3] 1
Philadelphia, Pa	375	313	(*)	(*)	237-8 and 58	[3] 1
Pittsburgh, Pa	375	323	(*)	(*)	237-11 and 61	[3] 1
SMSA, population 250,000 to 1,400,000						
Buffalo, N.Y	250	199	(*)	--------	237-18	[3] 1
Hartford, Conn	250	175	--------	(*)	237-68	[3] 1
SMSA, population 50,000 to 250,000						
Portland, Maine	160	135	(*)	--------	237-14	[3] 1
Lancaster, Pa	160	151	--------	(*)	237-64	[3] 1
Nonmetropolitan urban place, population 2,500 to 50,000						
Burlington, Vt	65	52	(*)	--------	237-24	(4)
Kingston, N.Y	65	47	(*)	--------	237-24	(4)
Lewistown, Pa	65	41	(*)	--------	237-24	(4)
Athol, Mass	65	60	--------	(*)	237-74	(4)
Millville, N.J	65	56	--------	(*)	237-74	(4)
Southbridge, Mass	65	53	--------	(*)	237-74	(4)
North Central	3,505	2,722	(*)	(*)	237-35	1, 2, 3
SMSA, population 1,400,000 and over						
Chicago, Ill	500	371	(*)	(*)	237-5 and 55	[3] 1
Cleveland, Ohio	375.	294	(*)	(*)	237-21 and 71	[3] 1
Detroit, Mich	375	290	(*)	(*)	237-1 and 51	[3] 1
St. Louis, Mo	375	319	(*)	(*)	237-15 and 65	[3] 1
SMSA, population 250,000 to 1,400,000						
Indianapolis, Ind	250	173	(*)	--------	237-10	[3] 1
Dayton, Ohio	250	180	--------	(*)	237-60	[3] 1
Wichita, Kans	250	189	--------	(*)	237-67	[3] 1
SMSA, population 50,000 to 250,000						
Cedar Rapids, Iowa	160	125	(*)	--------	237-17	[3] 1
Champaign-Urbana, Ill	160	126	(*)	--------	237-23	[3] 1
Green Bay, Wis	160	130	--------	(*)	237-73	[3] 1
Nonmetropolitan urban place, population 2,500 to 50,000						
Devils Lake, N.Dak	65	49	(*)	--------	237-27	(4)
Findlay, Ohio	65	55	(*)	--------	237-27	(4)
LaSalle, Ill	65	55	(*)	--------	237-27	(4)
Niles, Mich	65	61	(*)	--------	237-27	(4)
Owatonna, Minn	65	48	(*)	--------	237-27	(4)
Cambridge, Ohio	65	43	--------	(*)	237-77	(4)
Crookston, Minn	65	61	--------	(*)	237-77	(4)
Logansport, Ind	65	50	--------	(*)	237-77	(4)
Manhattan, Kans	65	45	--------	(*)	237-77	(4)
Menasha, Wis	65	58	--------	(*)	237-77	(4)
South	2,920	2,307	(*)	(*)	237-36	1, 2, 3
SMSA, population 1,400,000 and over						
Baltimore, Md	375	313	(*)	(*)	237-16 and 66	[3] 1
Washington, D.C	375	323	(*)	(*)	237-3 and 53	[3] 1
SMSA, population 250,000 to 1,400,000						
Atlanta, Ga	250	198	(*)	--------	237-6	[3] 1
Dallas, Tex	250	178	(*)	--------	237-20	[3] 1
Nashville, Tenn	250	201	--------	(*)	237-56	[3] 1
SMSA, population 50,000 to 250,000						
Austin, Tex	160	110	(*)	--------	237-12	[3] 1
Orlando, Fla	160	106	(*)	--------	237-19	[3] 1
Baton Rouge, La	160	112	--------	(*)	237-62	[3] 1
Durham, N.C	160	135	--------	(*)	237-69	[3] 1

See footnotes at end of table.

SURVEY OF CONSUMER EXPENDITURES, 1960–61—Continued

(SUMMARY OF SAMPLE SIZE AND AVAILABILITY OF DATA FOR URBAN AND RURAL AREAS, BY GEOGRAPHIC REGION, POPULATION STRATUM, AND SMSA OR OTHER URBAN PLACE)—Continued

Region, population stratum, SMSA, or other urban place	Number of—		Survey year		Publications	
	Assignment addresses	Usable schedules	1960	1961	BLS report number	Supplements
Urban—United States—Continued						
South—Continued						
Nonmetropolitan urban place, population 2,500 to 50,000						
Cleveland, Tenn.	65	43	(*)	--------	237-25	(4)
Griffin, Ga.	65	61	(*)	--------	237-25	(4)
McAllen, Tex.	65	38	(*)	--------	237-25	(4)
Reserve, La.	65	64	(*)	--------	237-25	(4)
Union, S.C.	65	50	(*)	--------	237-25	(4)
Vicksburg, Miss.	65	55	(*)	--------	237-25	(4)
Florence, Ala.	65	54	--------	(*)	237-75	(4)
Gainesville, Tex.	65	56	--------	(*)	237-75	(4)
Mangum, Okla.	65	50	--------	(*)	237-75	(4)
Martinsville, Va.	65	55	--------	(*)	237-75	(4)
Okmulgee, Okla.	65	48	--------	(*)	237-75	(4)
Sebring, Fla.	65	57	--------	(*)	237-75	(4)
West	[1] 2,320	[1] 1,770	(*)	(*)	237-37	1, 2, 3
SMSA, population 1,400,000 and over						
Los Angeles-Long Beach, Calif.	500	388	(*)	(*)	237-22 and 72	[3] 1
San Francisco-Oakland, Calif.	375	302	(*)	(*)	237-2 and 52	[3] 1
SMSA, population 250,000 to 1,400,000						
Seattle, Wash.	250	209	(*)	--------	237-9	[3] 1
Denver, Colo.	250	204	--------	(*)	237-59	[3] 1
Honolulu, Hawaii	250	215	--------	(*)	237-78	[3] 1
SMSA, population 50,000 to 250,000						
Bakersfield, Calif.	160	120	--------	(*)	237-70	[3] 1
Nonmetropolitan urban place, population 2,500 to 50,000						
Anchorage, Alaska	275	134	(5)	(5)	237-29	(4)
Gallup, N.Mex.	65	58	(*)	--------	237-26	(4)
Klamath Falls, Oreg.	65	44	(*)	--------	237-26	(4)
Eureka, Calif.	65	42	--------	(*)	237-76	(4)
Orem, Utah	65	54	--------	(*)	237-76	(4)

[*] Asterisk indicates year of survey.
[1] Includes Anchorage, Alaska, which was surveyed for 1959.
[2] Published by the U.S. Department of Agriculture.
[3] Supplements 2 and 3 not to be published; for a limited time photocopies of tables may be obtained from the Bureau of Labor Statistics at a nominal cost.
[4] No supplements available.
[5] Survey for 1959.

NOTE: The Bureau also has published reports for the following special-city surveys: Cincinnati, Ohio, 1959 (Report 237-28); Fairbanks, Alaska, 1959 (Report 237-30); Ketchikan, Alaska, 1960 (Report 237-31); Juneau, Alaska, 1960 (Report 237-32); Las Vegas, Nev., 1962 (Report 237-33); Houston, Tex., 1963 (Report 237-83); Kansas City, Kans.-Mo., 1963 (Report 237-79); Milwaukee, Wis., 1963 (Report 237-80); Minneapolis-St. Paul, Minn., 1963 (Report 237-81); and San Diego, Calif., 1963 (Report 237-82).

collected from half the sample of consumer units each year. Half of the remaining sample of smaller SMSA's and urban places was surveyed each year, i.e., for 1960 and 1961.

At the second stage, a sample of housing unit (living quarter) addresses was obtained in each city and in the entire urban part of each SMSA from the Comprehensive Housing Unit Survey (CHUS) conducted by BLS in the fall of 1960 [15] or 1961. The BLS housing unit surveys were based on area block samples designed to represent all noninstitutional living quarters (including nontransient accommodations in hotels and rooming houses) in the urban area.

In the third stage, a subsample of addresses was selected from the housing unit addresses obtained in the CHUS or Census, arranged by a number of characteristics, e.g., household size.

The first stage in selecting the *rural sample in metropolitan areas* utilized all 34 SMSA's selected for the urban sample. In the second stage, BLS conducted a Rural Housing Unit Survey (RHUS) which consisted of a listing of housing unit addresses in a stratified sample of Census Enumeration Districts (ED's) and a subsample of smaller segments or blocks in the designated ED's. Each housing unit was visited and classified as farm or nonfarm, and as to whether the family included a farm operator.[16] In the third stage, subsamples of rural nonfarm and rural farm housing unit addresses were selected from the RHUS listing by applying a ratio based on census data on rural farm and rural nonfarm households in each stratum.

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[15] Because of the shortage of time, the BLS did not conduct a CHUS in 1960 in places with population of 2,500 to 50,000. The 1960 sample for these cities was selected from 1960 Census of Housing and Population listings of living quarter addresses arranged by Enumeration Districts (ED's).

[16] These classifications, which were on the basis of Census definitions, made it possible for the BLS to refer addresses of all households meeting the Census definition of farm operator or farm resident to the USDA for inclusion in the rural sample.

In the first stage of the USDA's design for the *rural sample in nonmetropolitan areas*, counties were grouped by State Economic Areas[17] into 126 strata equal in weighted counts of rural farm and rural nonfarm dwellings, as the same sample of counties was to be used for both farm and nonfarm households. For each stratum, one county was chosen at random with a probability proportional to its weighted count. Counties were selected from 41 States. At the second stage, within each sample county, a selection of rural segments was made separately from rural places (100 to 2,500 inhabitants) and the open country. Addresses of all housing units in these segments were listed and classified as farm and nonfarm. Farm operators also were identified. In the third stage, subsamples of nonfarm and farm housing unit addresses were selected from the survey listings.

Sample Size

The master sample for the total urban and rural population included 17,283 living quarter addresses which were assigned to the interviewers.[18] Usable schedules were tabulated for 13,728 consumer units. The distribution of assignment addresses and usable schedules by urbanization, geographic region, and for individual metropolitan areas or cities in the urban sample is shown in the table.

Estimating Procedures

To describe the spending and saving of all families in the United States, data from the CES samples have been combined to obtain regional and U.S. levels.[19] This information was summarized for each level of urbanization and for the entire population by using a system of weights based on the 1960 Census of Population.

To obtain the weights, adjustments were made in the Census total of persons in the population on April 1, 1960, to correct for definitional differences between the Census and the CES universe. The institutional population and on-post military personnel, which were not included in the CES, were deducted from the Census population. Since the CES data apply to the full survey year and family size is measured in year-equivalent persons, while the Census data are a count of persons on April 1, 1960, the Census data were adjusted to take account of births, deaths, and net civilian migration during 1960. For the 50 States, the net effect of the adjustments was to lower the population total from 179,325,671 to 177,391,360.

The total adjusted population was distributed among the sampling strata in accordance with the distribution of the unadjusted population. The population represented by each surveyed area was divided by the average family size in the area, as determined from the survey, to obtain the total number of families represented by each area. The estimated number of consumer units in the universe for the United States was 55,306,253.

The adjusted 1960 population was used as urban weights for both 1960 and 1961. Weights were computed for 67 urban strata,[20] including Anchorage, Alaska, which was surveyed for 1959. (See table.) Rural nonfarm weights were computed for 42 strata—34 SMSA's and a farm operator and nonoperator stratum for each of the four regions. The rural farm sample was designed to be self-weighting within regions. Sample averages for the four regions were combined to U.S. levels by the application of weights consistent with those weights used in the urban and rural nonfarm parts of the CES.

In applying the weights to the stratum averages, to obtain U.S. and/or regional averages, the blow-up factor for each class (e.g., income group, family-size class, etc.) was the number of consumer units in the universe represented by each sample family in a stratum multiplied by the number of families in the sample for that class. The resulting numbers of consumer units became the multipliers in calculating stratum aggregates which were combined to regional and U.S. levels. The regional and U.S. averages were obtained by dividing the sum of the stratum aggregates by the number of consumer units in the universe for the class.

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[17] See appendix B.

[18] The address following each address in the master sample was picked as an alternate. The alternate address was substituted if the master address could not be located or the unit was vacant, if no one was at home after at least 2 visits, or if the occupant refused or was unable to give the minimum information required for classifying the family.

If the interviewer found more than one consumer unit living at an address, each unit was included in the sample. In hotels and apartments, the address given to the interviewer indicated a specific housing unit or units within the structure.

[19] The samples were not designed to provide tabulations by State.

[20] For a single year such as 1961, the city weights differed from the 1960–61 weights, in that cities surveyed in that year carried the entire weight for their respective region city-size stratum in the 1961 tabulations. In combining 1960 and 1961, each year's sample represented approximately half of the adjusted population. The 1959 data for Anchorage were weighted into the combined 1960–61 tabulation for the West and the United States, but not into the tabulations for 1960 or 1961.

Analysis and Presentation

Data were tabulated separately for each city and region listed in the table. All dollar values (income, expenditures, and changes in savings) were shown as averages per family (i.e., consumer unit). As city tabulations were completed, they were examined for reasonableness and internal consistency, and were compared with tabulations for other cities in the 1960–61 CES sample and with information from independent sources—principally the 1960 censuses of population and housing. Similar analytical comparisons were made for the regional and U.S. tabulations at each level of urbanization. For the urban sample, trends since 1950 were analyzed for cities which were in the CES sample for both periods. Each report contained brief analytical and interpretative text, plus definitions and statements on methodology.

The basic reports (see column 5, table) presented averages for major components of family accounts for consumer units classified by five characteristics: Family income after taxes, family size, age of family head, occupation of the head, and housing tenure. Supplement 1 presented the same information, classified by four additional characteristics: Education of the head, race, family type, and number of full-time earners. At the regional and U.S. levels, families also were classified by whether they lived inside or outside metropolitan areas; and inside SMSA's, by central city and other location.

Data for eight family characteristics in the above summaries were cross-classified (two variables) with each of other selected characteristics, as follows:

1. Family size with income, age of head, family type and location and size of place.
2. Age of head with income, occupation of head, and tenure.
3. Occupation of head with income, race, and tenure.
4. Education of head with income, and occupation of head.
5. Race with income, and tenure.
6. Number of full-time earners with income.
7. Tenure with income.
8. Family type with income, and occupation of head.

The two-variable tables are published as Supplement 2 to the basic reports.

Supplement 3 presents in detail the components of consumer expenditures, income, and changes in savings, which were summarized in the basic reports and Supplements 1 and 2. To illustrate, the category "automobile transportation" is broken down into 10 subgroups of expenditures. These detailed tabulations provide data for consumer units cross-classified by family size and income after taxes, and by family size and location of the family's residence inside or outside SMSA's.

Uses and Limitations

From its inception, the 1960–61 CES was planned to serve a variety of purposes. To this end, questionnaires and tabulation plans were circulated among a number of Federal agencies for comment. The BLS also formed the Consumer Expenditure Advisory Committee, representing academic, private research, and marketing users, and consulted with this Committee on a wide range of decisions affecting the CES. To date, the results have been used for only some of the contemplated purposes.

As stated earlier, the primary objective of the 1960–61 CES was to revise the CPI (chapter 10). The Bureau also uses the data to revise and expand its work in deriving standard quantity budgets for selected types of families (chapter 9). As time and resources permit, the Bureau proposes to draw upon this fund of consumer information to develop a broad program of family living conditions studies.[21]

The U.S. Department of Commerce relies on these family expenditure studies as the sole source of information for revising its benchmark estimates for a number of components in the household sector of the national accounts. The Internal Revenue Service used the published 1960–61 data to revise its tables of State sales tax payments, for guidelines to taxpayers in filing their Federal income tax returns. Currently the Department of Health, Education, and Welfare is studying the data in connection with numerous welfare analyses.

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[21] The Bureau has initiated a series of special analytical reports (BLS Report 238–1, et. seq.) based on the 1960–61 CES. A list of reports in this series is available upon request.

The Bureau also prepares methodological monographs for the expenditure surveys which compare national aggregates of income, expenditures, and savings derived from the CES with aggregates developed for the national income and product accounts by the U.S. Department of Commerce and with data from other sources.

A number of universities utilize the Bureau's basic data in a variety of research projects. The potentialities of the survey results in consumer market analysis are evident from reports issued by the National Industrial Conference Board, the Chamber of Commerce of the United States, and a variety of trade publications and business organizations.

Data obtained from a sample survey as complex as the survey of Consumer Expenditures are subject to many types of errors. These include sampling, recording, and processing errors, and errors due to the refusal or inability of some families to give the information requested.

All data were reviewed, edited, and screened to minimize processing errors. Chance variations due to sampling can be measured statistically, and the BLS has published preliminary rough estimates of sampling error in the urban sample, in its report for the urban United States. Preparation of more detailed estimates for both the urban and rural segments will depend upon the availability of resources. Each report contains a section alerting users to the cautions that must be exercised in using averages based on small samples and provides either the actual number or the basis for determining the number of families on which the averages in each table are based. Approximately 78 percent of the national sample of urban and rural families furnished usable schedules and some of the nonrespondents supplied limited information on family characteristics.[22] Among the participating families, inaccurate reporting is a source of error, despite continued research in schedule design and intensive training of the interviewers. Such inaccuracies result from memory errors, misunderstanding of a question or reluctance to answer it, and incorrect entries by the interviewer. Although the BLS and USDA have accumulated substantial knowledge about such reporting errors and will continue research in this field, these errors cannot be quantified satisfactorily.

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[22] This information is used in the monographs on methodology (see footnote 21) to evaluate the nature of the sample losses due to nonresponse. It has been the Bureau's practice not to attempt to introduce in the basic CES tables adjustments for nonresponse or for the underreporting which is common in virtually all compilations of income statistics. Such adjustments present many difficulties when data are cross-classified as extensively as are the CES tabulations.

Technical References

Number

1. Brady, Dorothy S. and Williams, Faith M., "Advances in the Techniques of Measuring and Estimating Consumer Expenditures," *Journal of Farm Economics*, May 1945, pp. 315–344.

   A review of changes in the direction of family expenditure surveys as the role of the consumer gained importance in economic theory in the mid-1930's. Discusses problems of concepts, definitions, sampling, and data collection that emerged as emphasis shifted from the analysis of expenditures of selected occupational groups to the interrelationships of expenditures, income, and savings of all types of families throughout the United States.

2. Ferber, Robert, "Research on Household Behavior," *The American Economic Review*, March 1962, pp. 19–63.

   A survey of the main empirical research since World War II on the determinants of household spending and saving behavior. Includes an extensive bibliography.

3. International Labour Office, *Family Living Studies—A Symposium*, Studies and Reports, New Series No. 63, Geneva, 1961.

   A collecton of recent case studies selected to draw attention to different types of family living studies and to their methods and problems. The 15 chapters include surveys from countries throughout the world.

4. Lamale, Helen H., "Changes in Concepts of Income Adequacy over the Last Century," *The American Economic Review*, May 1958, pp. 291–299.

   Relates changes in criteria for income adequacy to economic and social developments in three broad periods: 1860 to 1900—the "Subsistence" or "Break-Even" concept; 1900 to 1935—the "Living-Wage" concept; since 1935—the "Social" concept.

Technical References—Continued

Number

5. Lamale, Helen H. *Study of Consumer Expenditures, Incomes and Savings—Methodology of the Survey of Consumer Expenditures in 1950.* Philadelphia, Pa., University of Pennsylvania, Wharton School of Finance and Commerce, 1959.

   A comprehensive statement of the purposes, procedures, and reliability of results of the 1950 survey, with summaries of earlier surveys and research which influenced the 1950 methodology. Includes facsimiles of questionnaires used in BLS expenditure surveys for 1901, 1917–19, and 1950.

6. Stigler, George J., "The Early History of Empirical Studies of Consumer Behavior," *The Journal of Political Economy*, April 1954, pp. 95–113.

   Examines the relationship of the empirical work on consumer behavior to the theoretical work on income and demand prior to the twentieth century.

7. United Nations Statistical Office, *Handbook of Household Surveys: A Practical Guide for Inquiries on Levels of Living*, Provisional Edition. (Studies in Methods, Series F. No. 10.) New York, United Nations, 1964.

   Presentation of standard concepts, definitions, classifications, and tabulations, for household surveys with the aim that their adoption or adaptation would enhance the value of the surveys for national purposes and facilitate international comparison of results.

8. U.S. Bureau of the Census, *Historical Statistics of the United States—Colonial Times to 1957*, (1960) Chapter G. The same, *Continuation to 1962 and Revisions*, 1965.

   A compilation of tabular data from major Government and private statistical reports on consumer income and expenditures in the United States. Text describing each report is keyed to the tabulations.

9. U.S. Department of Labor, *How American Buying Habits Change* (1959).

   A popular-style book dovetailing various studies to yield a picture of changes in the consumption habits of the American people between 1875 and 1950. Includes a chapter of technical comments on consumption statistics and an extensive bibliography.

10. Williams, Faith M. and Zimmerman, Carle C., *Studies of Family Living in the United States and Other Countries: An Analysis of Material and Method*, U.S. Department of Agriculture, Miscellaneous Publication No. 223, December 1935.

    Analytical annotated bibliography of approximately 1,500 studies of family living made in 52 countries. Includes statements on the history and methodology of consumption studies since their inception.

    A continuation of this bibliography, covering 1946 and later years, is published in Miss Williams chapter, "International Comparisons of Patterns of Family Consumption," in *Consumer Behavior—Research on Consumer Reactions* (Lincoln H. Clark, ed.) New York, Harper and Brothers, 1958.

11. Zimmerman, Carle C., *Consumption and Standards of Living*, New York, D. Van Nostrand Co., Inc., 1936.

    A definitive analysis of family budget studies, with pertinent tabular materials, and discussion of psychological, social, and economic concepts and theories of consumption.

—Kathryn R. Murphy

Office of Prices and Living Conditions

Chapter 9. Family Budgets

Background

"Standards of living" refer to the goals of consumers and workers in their consumption of goods and services, use of leisure time, and conditions of work. Standard budgets, also described as family budgets, measure the total costs or amounts of income required to achieve the levels and manner of living implicit in these goals.[1] Cost estimates are developed by translating the generalized concept of a living standard into a list of commodities and services which can be priced. Thus, standard budgets are normative, or benchmark, estimates of living costs. They do not represent the ways in which family incomes should be spent, or the ways average families actually spend their incomes.

The first standard budgets prepared by the Bureau of Labor Statistics were developed for the specific purpose of evaluating living conditions of cotton-mill workers in Fall River, Mass. and in the South in 1908–09. These budgets described two standards of living—a minimum, including only bare necessities; and a fair standard, including some allowance for comfort. Another budget defining a standard of health and decency was developed in 1919. In the late 1930's, BLS cooperated with the Works Progress Administration in pricing two budgets: A maintenance budget, described as above the minimum subsistence level but approaching a satisfactory American standard of living; and an emergency budget, derived by cutting the maintenance budget for emergency conditions "with the least harm to the individuals and the social group." The information available at the time concerning the requirements for nutritionally adequate diets and healthful housing was incorporated into the definitions of the living standard in each of these budgets. For other components of family living, the "requirements" were formulated primarily on the basis of the personal judgment of the budget makers.[2]

In 1946, the Bureau compiled the City Worker's Family Budget for a "modest but adequate" standard of living. The procedures used standards of adequacy that reflected the judgments of scientists and experts where these were available; for other components, they depended on statistical analyses of consumer choices.[3] The same method, with some refinements, was used in 1959, in the interim revisions of the City Worker's Family Budget and the Budget for a Retired Couple.[4] These procedures were used again, with additional refinements, in the mid-1960's to develop the "intermediate" budgets (initially described as "moderate" budgets) for a four-person family and a retired couple. Subsequently, the costs of the intermediate level budgets were scaled downward and upward by a variety of techniques to produce a "lower" and a "higher" budget for each family type.[5] Procedures for the intermediate budgets of the 1960's and the scaling techniques are described in the remainder of this chapter.

Description of the Budgets

All normative estimates of living costs must be based on specific family situations. The construction of a family budget, therefore, requires a set of assumptions, i.e., specifications, which must be formulated explicitly by the budget maker at the outset. These relate to the age, size, and type of family; the manner of living appropriate for the specified family composition and the locality in which the family resides; and the position of the living standard in relation to the actual scale of consumption.

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[1] In 1954, at the request of the United Nations Economic and Social Council, a committee of experts from six different countries (including the United States) recommended that the following distinction be maintained between the terms "level" and "standard" of living: The "level of living" relates to the actual living conditions of a people. The "standard of living" relates to the aspirations or expectations of a people, that is, the living conditions which they seek to attain or regain, or which they regard as fitting and proper for themselves to enjoy. However, laymen and the general public frequently refer to "the high levels of living" actually achieved by the average American worker as the "high standard" of American living.

[2] Published sources for these budgets are described in Technical Reference No. 3, listed on p. 73.

[3] See Technical Reference No. 18. For description of a companion budget for an elderly couple, see Technical Reference No. 19.

[4] See Technical Reference Nos. 7 and 10.

[5] See Technical Reference Nos. 11, 14, 15, and 16.

Family composition has a significant effect on spending patterns, manner of living, and family needs. The budgets for a younger, four-person family, specifies that the family consists of an employed husband, age 38, who has a wife not employed outside the home, and two children, a girl of 8 and a boy of 13. This family type represents a middle stage in the life cycle, and it has been widely used as the unit for other budgets compiled for earlier periods. The family in the budgets for a retired couple consists of a husband and wife, age 65 or over, who are assumed to be self-supporting, in reasonably good health, and able to take care of themselves. This unit, which has a markedly different pattern of living and needs than the younger family, has been the subject of special concern in national policy formation over the last three decades. Budget quantities and budget component cost estimates for other family types cannot be derived as fractions or multiples of the quantities or cost estimates for food, shelter, clothing, transportation, etc. for the four-person family or the retired couple.[6]

Both types of families were assumed to live in an urban area. Assumptions also were made concerning the living arrangements and tenure of the families; inventories of housefurnishings, household equipment, and clothing; means of transportation; ownership of life insurance; provisions for medical care; savings positions, etc. In making these assumptions, the budget makers were guided by data on the prevalence of ownership of particular types of assets in the urban metropolitan population, and the availability of goods and services provided by governments for collective consumption or provided under collective bargaining agreements between employers and unions.

All three budgets provide for the maintenance of physical health and social well-being, and participation in community activities. Within this broad framework, different levels of adequacy were obtained by varying the assumptions concerning the manner of living and by providing different quantities and qualities of the necessary goods and services.

The content of the budgets is based on the manner of living and consumer choices in the 1960's. The lower budget differs from the intermediate and higher budgets in several specifications: The family lives in rental housing without air conditioning, (except for a proportion of retired couples who may own their own homes), relies heavily on public transportation, supplemented, where necessary, by the use of an older car, performs more services for itself, and utilizes free recreation facilities in the community. Compared with the intermediate budget, the life style in the higher budget, is marked by more homeownership, high levels of new-car ownership, more household appliances and equipment, and more paid-for services. For most items common to all budgets the quantities are greater and the qualities higher in the intermediate than in the lower budget, and in the higher than in the intermediate budget.[7]

Data Sources

Budget quantities and pricing specifications were derived from two sources: (1) Scientific or technical judgments concerning the requirements for physical health and social well-being; and (2) analytical studies of the choices of goods and services made by consumers in successive income groups, as reported in the Bureau's surveys of consumer expenditures,[8] to determine by statistical procedures the income class whose spending pattern would be used as the "norm" for a specified budget level.

Scientific standards for nutritionally adequate diets for individuals in different sex-age groups have been developed by the Food and Nutrition Board of the National Research Council, and translated by the U.S. Department of Agriculture into food plans at different cost levels. These food plans were used as the basis for the food-at-home component of the budgets.

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[6] Extensive analyses of consumption data dating back over more than a century have provided a variety of measures of general welfare; e.g., the relative adequacy of diets, the proportion of income spent for various categories of goods, or the proportion of income saved. These measures, either singly or in combination, have been used as the basis for determining scales of equivalent income for families of different size. One such scale is described in Technical Reference No. 12. The scale is based on the assumption that families spending the same proportion of income on food have attained equal levels of living. Although the scale is useful in estimating equivalent costs of goods and services, or net income requirements after income taxes and occupational expenses, it cannot be applied to individual items or major components of budget costs.

[7] For a discussion of the relativity of living standards, see Technical Reference Nos. 5 and 6.

[8] For a description of the Bureau's surveys of consumer expenditures, see chapter 8.

Housing standards established by the American Public Health Association and the U.S. Public Housing Administration were adopted for the budgets. These standards relate to sleeping space requirements, essential household equipment (including plumbing facilities), adequate utilities and heat, structural condition, and neighborhood location of the dwelling units. Fuel requirements were derived by analyzing actual fuel purchases of families in the specified types of dwellings in relation to degree-days to provide an adjustment for differences in climate. Estimates of electricity and utility services required for the appliances specified for the budgets were furnished by utility companies and associations.

The widespread use of insurance to cover the cost of major illness was accepted as a basis for a standard for medical care, and a family membership in a group health insurance plan (Medicare for the retired couple) was specified. Quantities of medical care services not covered by insurance were derived from data on utilization rates provided by the 1963–64 U.S. National Health Survey and the 1960–61 Consumer Expenditures Survey. Major medical provisions were specified for the higher budget.

No generally accepted scientific standards are available for other components of the budgets (clothing, housefurnishings, transportation, personal care, household operation, reading, recreation, tobacco, education, gifts and contributions, and miscellaneous expenses). Therefore, for most of these components a technique was developed which relied on the choices of consumers as the basis for a standard. Purchases were examined at successive income levels to determine the income level at which the rate of increase in quantities purchased began to decline in relation to the rate of change in income, i.e., the point of maximum elasticity. The average numbers and kinds of items purchased at this income level became the quantities and qualities specified for the intermediate level budget. In general, income classes below and above the classes used for the intermediate level were specified as the source of quantities for the lower and higher budgets, respectively.

For the transportation component, quantities for the intermediate and higher budgets were based on the average consumption pattern of families of each budget type. For the lower budget, average patterns of renter families were used. Except for the higher budget where costs include a car for all families, automobile ownership was specified in inverse relationship to the availability of mass public transportation. Mileage allowances were adjusted by the use of automobiles for work.

In determining budget costs, levels of prices paid for items are as important as the numbers of items bought. Items in the intermediate budget were priced in the types of stores and professional and service establishments customarily patronized by urban families. Prices, pricing procedures, reporting stores and service establishments, and price calculation methods were those used by the BLS for the Consumer Price Index,[9] except that additional quotations were obtained in some cases to calculate averages and different qualities were priced in other cases to represent the intermediate budget level. For some items in the lower and higher budgets, special prices were collected directly from stores and establishments. In the main, however, prices for those two levels were estimates in a variety of ways.[10]

Analysis and Presentation

In the methods described, a family budget is the end result of a multitude of decisions by the budget maker, based on standards formulated by scientists or experts or on analyses of data on consumption patterns from a variety of sources. The budgets are not simply the products of a survey of ways families at particular income levels actually spend their money. The judgment of the budget maker is involved in selecting among the family types and manners and levels of living to be represented; in determining the most appropriate sources of data to be used in deriving budget quantities; and in interpreting actual family consumption in terms of norms or benchmarks. The appropriateness of the operating assumptions can be evaluated only by the budget users in relation to the purposes to be served.[11]

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[9] For a description of the Consumer Price Index, see chapter 10.

[10] Technical Reference Nos. 13, 15, and 16 provide additional details on the methods, as well as lists of goods and services priced. Dollar cost estimates are provided in these reports and also in Technical Reference No. 9.

Budget estimates may be analyzed in four ways: (1) Costs are compared with income. However, costs for a specific family type should be compared only with average incomes, or income distributions, for families of the same type. This kind of analysis has been restricted, therefore, by the availability of cost estimates for only two family types. However, family equivalence scales may be used to develop estimates for comparable benchmark levels for families of other types. (2) Budget costs in one place are compared with costs in another, i.e., the budgets provide a basis for calculating an index of locality differences in living costs. The Bureau has provided this type of analysis in conjunction with its published reports. (3) Costs are compared over time to measure changes in living standards. The sporadic character of the Bureau's family budget research program imposes serious limitations on this type of analysis. Also the judgment factor in developing budgets introduces a serious bias for evaluating changes in the levels and living standards of families from decade to decade. (4) Finally, budget estimates of different levels are compared to provide a measure of the aggregate addition to income required to raise consumption to particular levels. The development of budgets for three different levels facilitates this type of analysis.

Uses and Limitations

Family budgets are used in economic research to appraise the economic condition of the population and to evaluate the need for, and the effect of, specific laws and programs. For example, normative living costs are used, to measure the extent to which social security or unemployment insurance benefits provide income sufficient to purchase the manner and content of living used to define a specified budget level; to estimate aggregate costs of consumer goods as a basis for developing public policies; or to prepare estimates of the number of families living below the specified budget level. Budgets also provide benchmarks for administrative determinations, as required by a number of existing laws or policies of social, welfare, and educational agencies; e.g., to establish criteria of eligibility for public assistance, public housing, support services for individuals in job development programs, subsidized medical or mental health, guidance services, or college scholarship aid.

In addition to their primary use as tools in evaluating income adequacy, family budgets are used to measure place-to-place differences in living costs, as a basis for family counseling, in wage negotiations, and as an aid in consumer education.

Locality indexes based on the BLS budgets reflect differences in costs of established residents in a community. Rental costs, for example, are based on the averages for occupied dwellings and are not a valid measure of the costs of vacant units available to new residents. Similarly, the costs of maintaining a home purchased 7 years ago, while an appropriate measure for an established, budget-type family, does not provide information on the relative costs of purchasing homes in current markets. The cost of food reflects not only differences in price levels but also, and more important, differences in regional preference patterns in the choice of food to meet nutritional standards.[12] The indexes, therefore, are more appropriate as research tools in analyses of the relationship between income and costs of established residents in different locations than as measures of differences in costs for families moving from one location to another.

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[11] For a discussion of the uses of family budgets, see Technical Reference Nos. 2, 4, 8, and 17.

[12] For a measure of the effect on food costs of price-level differences versus regional differences in the choice of foods, see Technical Reference No. 1.

Technical References

1. Brackett, Jean C., "Intercity Differences in Family Food Budget Costs," *Monthly Labor Review*, October 1963, pp. 1189–1194.

   An analysis of the effects on food budget cost estimates of using for all cities a single set of weights representing urban U.S. food patterns, or different weights for each city reflecting the food preferences of the region in which the city is located.

2. Brackett, Jean C., "New BLS Budgets Provide Yardsticks for Measuring Family Living Costs," *Monthly Labor Review*, April 1969, pp. 3–16.

   Provides a nontechnical description of the concepts and procedures used to develop the budgets for a four-person family at three levels of living, a summary of the spring 1967 cost estimates and locality indexes, and a discussion of the appropriate uses of the budgets.

3. Clorety, Joseph A., "Consumption Statistics: A Technical Comment," *How American Buying Habits Change*, Chapter X, 1959, pp. 217–242.

   Presents a representative cross-section of budgets compiled in this country during the 20th century. Shows average dollar cost figures for the total and for the major components of each budget.

4. Hawes, Mary H., "Measuring Retired Couples' Living Costs in Urban Areas," *Monthly Labor Review*, November 1969, pp. 3–16.

   Includes estimates of the costs of budgets for three levels of living for a retired couple in spring 1967 and budget-based locality indexes. Describes uses of these budgets as tools in determining eligibility for various programs and in helping older couples to evaluate their own spending habits.

5. Lamale, Helen H., "Changes in Concepts of Income Adequacy Over the Last Century," *American Economic Review*, May 1958, pp. 291–299.

   An analysis of the relationship over time between actual levels of living in the United States and the goals or standards of living which have been accepted in different historical periods and for different purposes.

6. Lamale, Helen H., "Poverty: The Word and the Reality," *Monthly Labor Review*, July 1965, pp. 822–827.

   Discusses the standard budget approach to the evaluation of income adequacy for different family types and in different geographical locations and estimation of the extent of poverty in the United States.

7. Lamale, Helen H. and Stotz, Margaret S., "The Interim City Worker's Family Budget," *Monthly Labor Review*, August 1960, pp. 785–808.

   Estimates the cost of a "modest but adequate" standard of living for a husband, wife, and two children (living in rented housing), at autumn 1959 prices, in 20 large cities and their suburbs. Includes the detailed list of the goods and services used to define the living standard for the 1950's, and describes the way this list was developed and priced.

8. Orshansky, Mollie, "Budget for an Elderly Couple: Interim Revision by the Bureau of Labor Statistics," *Social Security Bulletin*, December 1960, pp. 26–36.

   A summary report on "The BLS Interim Budget for a Retired Couple." (See Reference No. 10.) Includes a discussion of various conceptual problems encountered in developing normative living costs estimates for a retired couple, and some limitations of this particular budget.

9. Ruiz, Elizabeth, "Spring 1970 Cost Estimates for Urban Family Budgets," *Monthly Labor Review*, January 1971, pp. 59–61.

   Summarizes annual costs and comparative cost indexes at three levels of living for families of four persons in Spring 1970. Equivalence scale values are applied to four-person family consumption costs to obtain comparable estimates for other family types.

10. Stotz, Margaret S., "The BLS Interim Budget for a Retired Couple," *Monthly Labor Review*, November 1960, pp. 1141–1157.

    Estimates of the cost of a "modest but adequate" standard of living for a man age 65 or over and his wife (living in rented housing), at autumn 1959 prices, in 20 large cities and their suburbs. Includes the detailed list of the goods and services used to define the living standards for 1950's; and describes how this representative list was developed and priced.

11. U.S. Department of Labor, Bureau of Labor Statistics, "City Worker's Family Budget for a Moderate Living Standard, autumn 1966" (Bulletin 1570–1, 1967).

    Describes changes in this budget over the last two decades, and gives autumn 1966 costs

Technical References—Continued

for urban United States and costs and comparative indexes for 39 metropolitan areas, and 4 nonmetropolitan regions.

12. U.S. Department of Labor, Bureau of Labor Statistics, "Revised Equivalence Scale for Estimating Equivalent Incomes or Budget Costs by Family Type" (Bulletin 1570–2, 1968).

    Includes scale values for selected family type which can be used to approximate total costs of consumption for the three budget levels. Also includes a summary and discussion of the status of research on family equivalence scales.

13. U.S. Department of Labor, Bureau of Labor Statistics, "City Worker's Family Budget Pricing, Procedures, Specifications, and Average Prices, Autumn 1966" (Bulletin 1570–3, 1968).

    Reports on pricing methodology used in the intermediate budget and includes U.S. urban average prices and averages for five metropolitan areas for selected items priced for the budget.

14. U.S. Department of Labor, Bureau of Labor Statistics, "Retired Couple's Budget for a Moderate Living Standard, Autumn 1966" (Bulletin 1570–4, 1968).

    Describes changes in this budget over the last two decades, and gives autumn 1966 costs for urban United States and costs and comparative indexes for 39 metropolitan areas and four nonmetropolitan regions.

15. U.S. Department of Labor, Bureau of Labor Statistics, "Three Standards of Living for an Urban Family of Four Persons, Spring 1967" (Bulletin 1570–5, 1969).

    Describes budgets for a four-person family at three levels of living. Explains in detail the concepts, procedures, data sources, and estimating methods, and provides lists of goods and services priced. Includes spring 1967 costs and locality indexes.

16. U.S. Department of Labor, Bureau of Labor Statistics, "Three Budgets for a Retired Couple in Urban Areas of the United States, 1967–68" (Bulletin 1570–6, 1970).

    Describes budgets for a retired couple at three levels of living. Explains in detail the concepts, procedures, data sources, and estimating methods, and provides lists of goods and services paid. Includes spring 1967 costs and locality indexes. (A supplement to this Bulletin provides costs and indexes for 1969–70.

17. U.S. Department of Labor, Bureau of Labor Statistics, "Report of the Advisory Committee on Standard Budget Research," June 1963.

    Recommendations formulated by a committee of experts with extensive experience in using standard budgets on the needs for various types of budgets, general concepts of the standards of living to be described by the budgets, and methodological and other problems associated with estimating and publishing budget costs. Includes a selected bibliography on the major uses of standard budgets.

18. U.S. Department of Labor, Bureau of Labor Statistics, "Workers' Budgets in the United States: City Families and Single Persons, 1946 and 1947," (Bulletin 927, 1948).

    Concepts, definitions, and techniques used in developing the original City Worker's Family Budget for a four-person family, detailed list of goods and services priced, and 1946–47 cost estimates for 34 cities. Also an historical survey of family budgets, and summary data on State budgets for single women workers.

19. "A Budget for an Elderly Couple," *Social Security Bulletin*, February 1948, pp. 4–12.

    Estimates of the cost of a "modest but adequate" standard of living for a couple age 65 or older, at March 1946 and June 1947 prices, in eight large cities. (Concepts and techniques used to compile this budget were parallel to those employed in developing the original BLS City Worker's Budget. See Reference No. 18.)

—JEAN C. BRACKETT

Chapter 10. Consumer Prices

Background

The Consumer Price Index was initiated during World War I when rapid changes in living costs, particularly in shipbuilding centers, made such an index essential in wage negotiations. To provide appropriate weighting patterns for the index, studies of family expenditures were conducted in 92 industrial centers in 1917–19. The Bureau of Labor Statistics began publication of indexes for 32 individual cities in 1919. Regular publication of U.S. city average indexes was not begun until 1921, but indexes were estimated back to 1913.[1] Since that time the weighting factors, the list of items included in the market basket, and the cities in which price data were collected for calculating the index have been updated several times.

Because people's buying habits had changed substantially by the mid-1930's, a new study was made covering expenditures in the years 1934–36 which provided the basis for a comprehensively revised index introduced in 1940 with retroactive calculations back to 1935.

During World War II, when many commodities were scarce and goods were rationed, the index weights were adjusted temporarily to reflect these shortages. Again in 1950, the Bureau made interim adjustments, based on surveys of consumer expenditures in seven cities between 1947 and 1949, to reflect the most important effects of immediate postwar changes in buying patterns.[2] This adjustment was followed by the first comprehensive postwar revision of the index, which was completed in January 1953.[3] At that time, not only were the weighting factors, list of items, and sources of price data updated, but many improvements in pricing and calculation methods were introduced. Also, coverage of the index was extended to small cities so as to represent all urban wage-earner and clerical-worker families. The most recent revision was completed in 1964, with the introduction of new expenditure weights based on spending patterns in 1960–61, and updated samples of cities, goods and services, and retail stores and service establishments.

The manner in which the index has been used and its acceptance by the public have changed from time to time. It has seen many appraisals, criticisms, and investigations. Perhaps the most far-reaching study was conducted during World War II by the President's Committee on the Cost of Living.[4] The House Committee on Education and Labor conducted a detailed examination of the index in 1951.[5] The most recent study was made by the Price Statistics Review Committee, appointed by the National Bureau of Economic Research, at the request of the Office of Statistical Standards of the Bureau of the Budget, to review all government price statistics.[6]

As a result of these investigations and the Bureau's continuing efforts to improve the index, changes in coverage, collection, and calculation procedures have been introduced at various times. Examples of these changes include the addition of medium and small cities to the city sample in 1953, the extension of coverage to include single workers in 1964, and institution of direct pricing of restaurant meals in 1953.

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[1] Collection of food prices back to 1890 had been initiated in 1903. During the course of the 1917–19 expenditure survey, retail prices for other articles were collected in 19 cities for December of each year back to 1914 and in 13 other cities back to December 1917 only. Retail prices of food and wholesale prices of other items were used to estimate price change from 1914 back to 1913.

[2] See *Interim Adjustment of Consumers' Price Index* (BLS Bulletin 1039, 1951).

[3] See *Consumer Prices in the United States 1953–58* (BLS Bulletin 1256).

[4] *Report of the President's Committee on the Cost of Living*, Office of Economic Stabilization, Washington, 1945.

[5] *Consumers' Price Index*—Report of a Special Subcommittee of the Committee on Education and Labor. House of Representatives, 82/1, Subcommittee Report No. 2, Washington, 1951.

[6] *Government Price Statistics*—Hearings before the Subcommittee on Economic Statistics, Joint Economic Committee, Congress of the United States, 87/1, Part 1, Washington, January 24, 1961.

Description of the Index

Concept and Scope.[7] The Consumer Price Index (CPI) is a statistical measure of changes in prices of goods and services bought by urban wage earners and clerical workers,[8] including families and single persons. The index often is called the "cost-of-living index," but its official name is Consumer Price Index for Urban Wage Earners and Clerical Workers. It measures changes in prices, which are the most important cause of changes in the cost of living, but it does not indicate how much families actually spend to defray their living expenses. Prior to January 1964, the complete name for the index was: Index of Change in Prices of Goods and Services Purchased by City Wage-Earner and Clerical-Worker Families to Maintain Their Level of Living.

The Consumer Price Index is a weighted aggregative index number with "fixed" or "constant" annual weights, or it often is referred to as a "market basket" index. Thus, in the Consumer Price Index the procedure is to measure price change by repricing at regular time intervals and comparing aggregate costs of the goods and services bought by consumers in a selected base period. The quantities of these goods and services are kept constant except at times of weight revisions. Since new weights are introduced without affecting the index level, any change in aggregate costs is due to price change. The quantities represent not only annual consumption of the goods and services actually priced for the index but also consumption of related items for which prices are not obtained, so that the total cost of the market basket represents total consumer spending for goods and services.

The index represents price change for everything people buy for living—food, clothing, automobiles, homes, housefurnishings, household supplies, fuel, drugs, and recreational goods; fees to doctors, lawyers, beauty shops; rent, repair costs, transportation fares, public utility rates, etc., including all taxes directly associated with the purchase of an item and its continued ownership. It deals with prices actually charged to consumers, including sales and excise taxes, since these are an inherent part of the market price the consumer must pay for goods and services subject to such taxes. It also includes real estate taxes on owned homes which are part of the price of homeownership. However, it does not include income or other personal taxes, since they are not associated with prices of specific goods and services although they may have an indirect impact.[9] Since 1953, it has treated the purchase of a home in the same way as the purchase of such durable goods as automobiles, refrigerators, etc.

In the 1964 revision, the index coverage was extended to include single consumer units[10] in addition to families of two or more.[11] The average size of families represented in the index is about 3.7 persons, and their average family income in 1960–61 was about $6,230 after taxes. The average income after taxes of single persons represented in the index was about $3,560.

Weighting Structure. The annual consumption patterns represented in the index since January 1964 were determined in the Survey of Consumer Expenditures (CES)[12] in 66 Standard Metropolitan Statistical Areas (SMSA's) and smaller cities

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[7] See article by Sidney A. Jaffe, "The Statistical Structure of the Revised CPI", *Monthly Labor Review,* August 1964, pp. 916–924.

[8] The definition of wage earners and clerical workers is based on the occupational classification used by the Bureau of the Census for the 1960 Census of Population and listed in the Alphabetical Index of Occupations and Industries. The group includes craftsmen, foremen, and kindred workers, such as carpenters, bookbinders, etc.; operatives and kindred workers, such as apprentices in the building trades, deliverymen, furnacemen, smelters, and pourers, etc.; clerical and kindred workers; service workers, except private household, such as waitresses, practical nurses, etc.; sales workers; and laborers, except farm and mine. It excludes professional, technical, and kindred workers, such as engineers and teachers; farmers and farm managers; managers, officials and proprietors, except farm; private household workers; and farm laborers and foremen. A consumer unit included in the 1960–61 Survey of Consumer Expenditures was classified in the index group if more than half the combined income of all family members was obtained in a wage-earner and clerical-worker occupation and at least one family member was a full-time earner (i.e., worked 37 weeks or more during the survey year).

[9] For a more detailed discussion, see "Taxes and the Consumers' Price Index," *Monthly Labor Review,* January 1958, pp. 53–57. (Reprint 2090.)

[10] A person living alone or in a household with others from whom he was financially independent; i.e., his income and expenditures were not pooled. Terms such as "single persons, single workers, singles, etc." used subsequently, refer to single consumer units and not to unmarried persons.

[11] From January through November 1964, the Bureau computed a separate index applying only to families of two or more, for comparability with the previous series. Since the same items were priced for families and singles, the overall movement of the separate index was identical with the index including single workers and it was discontinued.

[12] The Survey of Consumer Expenditures is discussed in Chapter 8 of this bulletin. The selection of the expenditure survey and CPI city samples is described in detail in an article by Marvin Wilkerson, "The Revised City Sample for the Consumer Price Index," *Monthly Labor Review,* October 1960, pp. 1078–1083. (Reprint 2352)

Table 1. Cities, Population Weights, and Pricing Schedule for the Revised Consumer Price Index

City and size stratum	Population weight [1]	Pricing schedule [2]					
		Food [2]	Other items				
			Samples	Schedule [3]			
				M	1	2	3
A. Standard metropolitan statistical areas of 1,400,000 or more in 1960:							
Baltimore, Md.	1.402	1A, 1B, 2A, 2B	1A, 2B				X
Boston, Mass.	1.930		1A, 2B		X		
Chicago-Northwestern Indiana [4]	5.552		1A, 1B, 2A, 2B	X			
Cleveland, Ohio	1.325		1A, 2B			X	
Detroit. Mich.	2.895		1A, 2B	X			
Los Angeles-Long Beach, Calif.	5.017		1A, 2B	X			
New York-Northeastern New Jersey [4]	12.577		1A, 2B	X			
Philadelphia, Pa.	2.703		1A, 2B	X			
Pittsburgh, Pa.	1.565		1A, 2B		X		
St. Louis, Mo.	1.428		1A, 2B				X
San Francisco-Oakland, Calif.	2.372		1A, 1B, 2A, 2B				X
Washington, D.C.	1.255		1A, 1B, 2A, 2B			X	
B. Standard metropolitan statistical areas of 250,000 to 1,399,999 in 1960: [5]							
Atlanta, Ga.	2.934	1A, 2B	1A, 2B				X
Buffalo, N.Y.	2.347		1A, 2B			X	
Cincinnati, Ohio-Ky.	.740		1A, 2B				X
Dallas, Tex.	2.934		1A, 2B			X	
Dayton, Ohio	1.096		1A, 2B			X	
Denver, Colo.	1.838		1A, 2B		X		
Hartford, Conn.	2.348		1				X
Honolulu, Hawaii	.354		1A, 2B				X
Houston, Tex.	.999		1A, 2B		X		
Indianapolis, Ind.	1.095		2				X
Kansas City, Mo.-Kans.	.710		1A, 2B				X
Milwaukee, Wis.	.850		1A, 2B			X	
Minneapolis-St. Paul, Minn.	1.042		1A, 2B		X		
Nashville, Tenn.	2.933		2		X		
San Diego, Calif.	.672		1A, 2B			X	
Seattle, Wash.	1.837		1A, 2B			X	
Wichita, Kans.	1.098		1A, 2B		X		
C. Standard metropolitan statistical areas of 50,000 to 249,999 in 1960:							
Austin, Tex.	1.250	1	1		X		
Bakersfield, Calif.	1.323	2	2				X
Baton Rouge, La.	1.250	2	2			X	
Cedar Rapids, Iowa	1.284	1A, 2B	1A, 2B		X		
Champaign-Urbana, Ill.	1.284	1A, 2B	1A, 2B		X		
Durham, N.C.	1.250	1A, 2B	1A, 2B				X
Green Bay, Wis.	1.284	1	1			X	
Lancaster, Pa.	1.803	1	1		X		
Orlando, Fla.	1.250	1A, 2B	1A, 2B				X
Portland, Maine	1.803	2	2			X	
D. Urban places of 2,500 to 49,999 in 1960:							
Anchorage, Alaska	.065	1, 2	1, 2		X		
Crookston, Minn.	1.352	1	1				X
Devils Lake, N.Dak.	1.352	2	2				X
Findlay, Ohio	1.352	1	1			X	
Florence, Ala.	1.227	1	1		X		
Kingston, N.Y.	1.171	2	2				X
Klamath Falls, Oreg.	1.338	1	1			X	
Logansport, Ind.	1.352	2	2		X		
Mangum, Okla.	1.226	1	1				X
Martinsville, Va.	1.227	2	2			X	
McAllen, Tex.	1.227	2	2				X
Millville, N.J.	1.171	2	2			X	
Niles, Mich.	1.351	1	1		X		
Orem, Utah	1.339	2	2		X		
Southbridge, Mass.	1.170	1	1			X	
Union, S.C.	1.227	1	1			X	
Vicksburg, Miss.	1.226	2	2		X		

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[1] The 18 largest Standard Metropolitan Statistical Areas as defined for the 1960 Census of Population were selected on a certainty basis and represent themselves only in the population weight patterns. The other sample selections carry not only their own population weights but also prorata shares of the population weights of all cities in their region in the same population class.

[2] Item samples are identified as samples "1" and "2." Outlet samples are identified as samples "A" and "B." The determination as to the extent of sampling within an area depended on plans for publishing separate area indexes and on plans for developing estimates of sampling error and its components.

[3] Foods, fuels, and several other items are priced every month in all cities. Prices of a few items are collected semiannually or annually in all cities. Prices of other goods and services are obtained on the schedule indicated:
M=Every month.
1=January, April, July, and October.
2=February, May, August, and November.
3=March, June, September, and December.

[4] Standard Consolidated Areas.

Population weights revised for this group beginning January 1966 covering the period 1960–61, except for Anchorage, Alaska, which was surveyed for 1959. Expenditure records were obtained from the 4,343 urban families of two or more persons and from the 517 single workers included in the survey who were classified as wage earners or clerical workers.

Sixteen cities in the smallest size class which were included in the 1960–61 survey are not included in the CPI sample for pricing. However, in the weight derivation, expenditures by consumer units in these small cities were included with those for the 16 small cities priced for the index, so that the resulting weights are based on the total sample of 32 small cities.

In establishing index weights from the detailed expenditure data, about 400 items were selected objectively to compose the "market basket" for current pricing, beginning with the January 1964 "new series" indexes. Not all items are priced in every SMSA or city. In order to make possible estimates of sampling error, two subsamples of items have been established. These are priced in different areas and in different outlet samples, as indicated in table 1. The population weights shown in the table are used to combine price data for the 56 individual areas in the CPI sample into a U.S. city average. They were derived from the 1960 Census of Population but adjusted to represent the wage-earner clerical-worker coverage of the CPI. For the 18 largest SMSA's, which are included in the sample with certainty, the weights are based on their respective populations only. For the remaining cities, which were selected by probability sampling methods to represent all other urban places, the weights represent not only the specific city population, but also the population of all cities in the same region and size class. Thus, every city in the same region and size class (other than the 18 largest) has identical population weights.[13]

The list of items priced includes all the most important goods and services and a sample of the less important ones. In combination, these represent all items purchased. Table 4 contains a complete list of the items priced for the index. The content of this market basket in terms of items, quantities, and qualities is kept essentially unchanged [14] in the index calculation between major revisions so that any movement of the index from one month to the next is due solely to changes in prices. A comparison of the total cost of the market basket from period to period yields the measure of average price change.

In the selection of the item sample for the revised CPI, except for the choice of the particular quality or variety of the item to be priced (specification), probability sampling techniques were used, as described later. The more important items are included in the sample with certainty. The remaining items within a given expenditure class were selected with probability. The relative importance of a certainty item represents consumer spending for that item only. "Probability" items represent all other items within the expenditure class. The total weight of these items is divided equally among the probability items within an expenditure class. Table 2 shows relative importances in the national index as of December 1963. Individual relative importances are not shown in the table for probability items; rather their combined importance is shown as "other priced items" in each expenditure class.

Data Sources and Collection Methods

Prices are obtained in the 56 area CPI sample by personal visit to a representative sample of nearly 18,000 stores and service establishments where wage and clerical workers buy goods and services, including chain stores, independent grocery stores, department and specialty stores, restaurants, professional people, and repair and service shops.[15] Rental rates are obtained from about 40,000 tenants. Reporters are located both in the city proper and in suburbs of each urban area. Cooperation is completely voluntary.

Prices are collected in each urban location at intervals ranging from once every month to once every 3 months, as indicated in table 1, with a few items surveyed semiannually or annually. Because food prices change frequently, and because

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[13] Six additional B size Standard Metropolitan Statistical Areas were added to the national index in January 1966. Since they were selected outside the probability framework, they were assigned only their own population weight which was substracted from that of other stratum B cities in the same region.

[14] Minor weight revisions are introduced by linking.

[15] For a more complete discussion, see *The Consumer Price Index: Pricing and Calculation Procedures*, unnumbered paper by Doris P. Rothwell, Bureau of Labor Statistics, U.S. Department of Labor, 1964.

TABLE 2. CONSUMER PRICE INDEX (NEW SERIES)[1] RELATIVE IMPORTANCE OF MAJOR GROUPS, SPECIAL GROUPS AND INDIVIDUAL ITEMS SELECTED WITH CERTAINTY[2] DECEMBER 1963

Components	Percent of all items December 1963
All items	100.00
MAJOR GROUPS	
Food	22.43
Housing	33.23
Apparel and upkeep	10.63
Transportation	13.88
Health and recreation	19.45
Medical care	5.70
Personal care	2.75
Reading and recreation	5.94
Other goods and services	5.06
SPECIAL GROUPS	
All items less shelter	79.85
All items less food	77.57
Commodities	65.97
Nondurables	47.19
Durables	18.78
Services	34.03
Commodities less food	43.54
Nondurables less food	24.76
Apparel commodities	9.16
Apparel commodities less footwear	7.65
Nondurables less food and apparel	15.60
Household durables	5.69
Housefurnishings	4.72
Services less rent	28.53
Household services less rent	13.47
Transportation services	4.86
Medical care services	4.56
Other services	5.64
INDIVIDUAL ITEMS	
Food	22.43
Food at home	17.89
Cereals and bakery products	2.45
Cereals	.80
Bakery products	1.65
White bread	.60
Other priced items	1.05
Meats, poultry, and fish	5.63
Meats	4.45
Beef and veal	2.21
Hamburger	.57
Steak	.80
Other priced items	.84
Pork	1.30
Pork chops	.36
Bacon	.30
Other priced items	.64
Other meats	.94
Poultry	.73
Frying chickens	.51
Other priced items	.22
Fish	.45
Dairy products	2.80
Milk, fresh (grocery)	.85
Milk, fresh (delivered)	.68
Butter	.25
Other priced items	1.02
Fruits and vegetables	3.02
Fresh fruits	.76
Apples	.17
Bananas	.15
Oranges	.20
Other priced items	.24
Fresh vegetables	.94
Lettuce	.16
Potatoes	.24
Tomatoes	.14
Other priced items	.40
Processed fruits and vegetables	1.32
Other food at home	3.99
Eggs	.64
Fats and oils	.55
Margarine	.15
Other priced items	.40
Sugar and sweets	.64
Nonalcoholic beverages	1.01
Coffee, can and bag	.40
Other priced items	.61
Prepared and partially prepared food	1.15
Food away from home	4.54
Restaurant meals	3.75
Between meal snacks	.79
Housing	33.23
Shelter	20.15
Rent	5.50
Hotels and motels	.38
Homeownership	14.27
Purchase and financing	9.11
Home purchase	6.28
Mortgage interest	2.83
Taxes and insurance	2.13
Real estate taxes	1.72
Property insurance	.41
Maintenance and repairs	3.03
Commodities	.98
Services	2.05
Fuel and utilities	5.26
Fuel oil and coal	.73
Fuel oil	.67
Coal	.06
Gas and electricity	2.71
Gas	1.30
Electricity	1.41
Other utilities	1.82
Telephone	1.38
Water and sewerage	.44
Household furnishings and operation	7.82
Textile housefurnishings	.61
Furniture	1.44
Bedroom suite	.28
Living room suite	.28
Other priced items	.88
Floor coverings	.48
Rugs, soft surface	.34
Other priced items	.14
Appliances	1.36
Refrigerators	.28
Other priced items	1.08
Other housefurnishings	.83
Housekeeping supplies	1.55
Housekeeping services	1.55
Domestic service	.26
Baby sitter	.29
Postage	.23
Other priced items	.77
Apparel and upkeep	10.63
Men's and boys' apparel	2.86
Men's apparel	2.21
Suits, year round	.36
Other priced items	1.85
Boys' apparel	.65
Women's and girls' apparel	4.08
Women's apparel	3.23
Winter coats	.28
Street dresses	.50
Hose, nylon	.39
Other priced items	2.06
Girls' apparel	.85
Footwear	1.51
Street shoes, men's	.26
Street shoes, women's	.26
Other priced items	.99
Other apparel	2.18
Commodities	.71
Services	1.49
Dry cleaning	.79
Men's suit	.44
Women's dress	.35
Other priced items	.68
Transportation	13.88
Private transportation	12.64
Autos and related goods	9.02
Auto purchase	5.02
New cars	2.55
Used cars	2.47
Gasoline and motor oil	3.28
Gasoline	3.05
Motor oil	.23
Auto parts	.72
Automobile services	3.62
Auto repairs and maintenance	.98
Other automobile expenses	2.64
Auto insurance	1.42
Registration fees	.37
Drivers' license	.04
Parking fees	.18
Auto financing charges[3]	.63
Public transportation	1.24
Local transit	.78
Taxicabs	.14
Train fares	.07
Airplane fares	.20
Intercity bus fares	.05

See footnotes at end of table.

TABLE 2. CONSUMER PRICE INDEX (NEW SERIES)[1] RELATIVE IMPORTANCE OF MAJOR GROUPS, SPECIAL GROUPS AND INDIVIDUAL ITEMS SELECTED WITH CERTAINTY[2] DECEMBER 1963—Continued

Components	Percent of all items December 1963
Health and recreation	19.45
Medical care	5.70
Drugs and pharmaceuticals	1.14
Over-the-counter items	.50
Prescriptions	.64
Professional services	2.59
Family doctor, house visit	.12
Family doctor, office visit	.77
Optometric examination and eyeglasses	.29
Dentists' fees	.86
Other priced items	.55
Hospital services	.36
Health insurance [4]	1.61
Hospital services	.66
Nonhospital services	.71
Overhead	.24
Personal care	2.75
Toilet goods	1.52
Services	1.23
Men's haircut	.51
Other priced items	.72
Reading and recreation	5.94
Recreation	4.36
Recreational goods	2.78
TV sets	.63
Other priced items	2.15
Health and recreation—Continued	
Reading and recreation—Continued	
Recreation—Continued	
Recreational services	1.58
Movies (indoor)	.38
Bowling fees	.36
Other priced items	.84
Reading and education	1.58
Newspapers	.50
College tuition	.23
Other priced items	.85
Other goods and services	5.06
Tobacco products	1.89
Cigarettes	1.74
Other priced items	.15
Alcoholic beverages	2.64
Beer	1.06
Whiskey and wine	.78
Away from home	.80
Personal expenses	.53
Funeral services	.28
Bank service charges	.12
Legal services	.13
Miscellaneous [3] [5]	.35

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[1] For a description of the new series, see *The Consumer Price Index, (Revised January 1964). A Short Description.*

[2] The list of items priced includes all the more important goods and services and a sample of the less important ones. In combination, these represent all items included in the CPI. Weights for individual certainty items are shown separately. Some of them, however, are represented by more than one specification, but the weights for the individual specifications are not shown. The remaining weight of each expenditure class having both certainty and probability items was shared equally by the probability items as of December 1963, except in a few cases where weights for duplicated items have double weights.

[3] Not actually priced; imputed from priced items.

[4] Cost of health insurance is imputed to price changes for representative services plus the cost of overhead. For a more complete discussion, see article by James C. Daugherty, "Health Insurance in the Revised CPI," *Monthly Labor Review*, November 1964, pp. 1299–1300.

[5] Personal financing charges other than mortgage interest and auto financing.

foods are a significant part of total spending, food pricing is conducted every month in each urban location. Prices of most other goods and services are collected every month in the five largest urban areas and every 3 months in all other places. Pricing of food is done each month on 3 consecutive days early in the month; rents and items for which prices are obtained by mail are reported as of the 15th of the month; pricing of other items extends over the entire calendar month. The Bureau uses mail questionnaires to obtain data on streetcar and bus fares, public utility rates, newspaper prices, and prices of certain other items which do not require personal visit by Bureau agents. For a number of items, e.g., home purchase, college tuition, used cars, magazines, etc., data collected by other Government agencies or private organizations are used.

To insure that the index reflects only changes in prices and not changes due to quantity or quality differences, the Bureau has prepared detailed specifications which describe the physical characteristics of the items in the market basket. Specially trained Bureau representatives examine merchandise in the stores to determine whether the goods and services for which they record prices conform to the specifications. Where the precisely specified item is not sold at a particular retail establishment, the Bureau's representative quotes prices and obtains a detailed technical description of the item nearest to the physical characteristics of the specification, in order to insure that prices will be quoted on the same quality and quantity from time to time. At the first pricing in an outlet the agent selects the volume selling item meeting specification, making sure that it is regular merchandise in good condition and available in a customary assortment of colors, patterns, etc.

At the subsequent pricings the agent prices the identical item if it is still available in a reasonable assortment and selling in substantial volume. If it is not, she must substitute another volume selling item, meeting specification, if possible. If she cannot, she prices an item deviating from specification. Prices of substitute items meeting specification are compared directly. Prices of deviating items are introduced by linking or splicing in such a way that the difference in price between the specification and the deviating item is not reflected as a price change. If it is possible to obtain an estimate of the value of the quality difference, prices of the previous item are adjusted by the quality estimate and compared with prices for the current month.

When the sample of reporters is changed for any reason, prices from the new reporter also are introduced by linking.

Sampling

A complicated index such as the CPI must be based on a whole complex of samples.[16] A sample of cities or areas is required in which expenditure surveys and price collection will be conducted. Within each area there must be a sample of families or consumer units, from which consumer expenditures will be obtained. It is convenient, but not essential, that the city sampling points be the same for price collection as for the Consumer Expenditure Surveys.

Further, since it is impossible to price all the thousands of items which consumers buy, it is necessary to select a sample of items for pricing, to represent price movement of all items. Samples of outlets are needed at each sampling point in which price quotations are obtained for the selected items. Finally, pricing usually is done at a specific time of the month or quarter so there is, in effect, a sampling of time.

In the 1964 revision, the Bureau of Labor Statistics used probability sampling to a greater extent than had been done previously, despite the well-known difficulties involved. At the same time, the Bureau attempted to include in the CPI sampling design some method for obtaining an estimate, even if only a crude one, of sampling error. Probability sampling is a necessity, of course, if this is to be done in a conventional manner. However, even if probability sampling could be followed rigorously through all the complicated CPI structure, the mere computational load would be so extensive that it would be impractical to compute measures of error except by some "simple" approach. The objective, therefore, has been approached by the "replication" method.

The sample design includes an ex post facto pairing of probability cities (or Standard Metropolitan Statistical Areas), two replicated item samples, and replicated outlet samples. In addition to the minimum program, designed to produce an estimate of the total sampling error in the index from all sources, the structure includes more extended replication in selected cities aimed at permitting some evaluation of the components of the error, that is, variation in sampling results due to sampling of cities, items, and outlets.

City Sample. A core sample of 50 SMSA's (see footnote 13) or smaller cities for the index, supplemented by 16 additional D size cities for the family expenditure surveys was the maximum size consistent with available budget. These additional D size cities were surveyed because expenditure patterns are more variable among small cities than among large cities. The primary sampling units (PSU's) are Standard Metropolitan Statistical Areas as they were defined by the Bureau of the Budget prior to the 1960 Census, except that the Standard Consolidated Areas for New York and Chicago were used, plus individual urban places outside the SMSA's. Because 1960 Census data were not then available, the measure of size used in sample selection was the estimated urban population as of January 1, 1959. The population weights actually assigned are based on 1960 data. The PSU's were stratified by broad region and by size into 12 regional-size strata. The 12 largest SMSA's were selected with certainty, that is, they represent themselves in the sample design. Since Alaska and Hawaii have been added in the revised CPI, one sample selection has been allocated to each of these two States. The remaining 36 selections are allocated to the 12 regional-size strata on the basis of relative population and relative costs of pricing cities of different size. Four size strata are defined as follows:

A. The 12 largest SMSA's on the basis of urban population, in effect those with population over 1,400,000;

B. Other large SMSA's with urban population greater than 250,000;

C. SMSA's with urban population of 50,000–250,000; and

D. Nonmetropolitan urban places with population less than 50,000.

The method of selection used is known generally as "controlled selection" which was described by Roe Goodman and Leslie Kish in the September

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[16] For a more detailed discussion, see *Sampling Aspects of the Revised CPI*, unnumbered paper by Marvin Wilkerson, Bureau of Labor Statistics, U.S. Department of Labor, 1964.

1950 issue of the *Journal of the American Statistical Association* (pp. 350–372). This method accomplishes a good geographic dispersion of sampling points across the country.

After the initial 50-area sample was selected, the BLS received funds to prepare city indexes for six additional large SMSA's—Cincinnati, Houston, Kansas City, Milwaukee, Minneapolis-St. Paul, and San Diego—as part of a plan to publish indexes for each SMSA with 1,000,000 total population in 1960. These areas were added to the national index in January 1966.

Samples of Consumer Units. The CES samples were chosen as subsamples of housing units enumerated in advance Comprehensive Housing Unit Surveys (CHUS) conducted in each area late in the year preceding the actual survey date.[17] The CHUS also serve as the source of the samples of rental dwellings for measuring price change in rents, and of owner occupied units for measurement of changes in property taxes. They also provide data for weights for home purchase. The actual size of the CHUS sample in an area is determined primarily by the rental sample desired and by the proportion of renters in the given area, as estimated from Census data. The number of addresses enumerated in the CHUS is usually many times larger than it is in the samples for surveys of consumer expenditures.

Sampling of Items. A classification system has been developed to provide a logical publication framework containing the traditional major expenditure groups, subgroups, etc., but, in a broader sense, to divide the thousands of goods and services purchased by consumers into meaningful and manageable components of the universe. It provides the framework for the selection of the item sample and for the derivation of index weights.

Two levels of the classification system are of critical importance. These are: (1) the item level, and (2) the level which defines the finest stratification for the item sampling; that is, the strata to which allocations of items are made and within which probability samples of items are selected. The term "expenditure class" (EC) is given to this level. The expenditure classes are primarily groupings of items which serve similar human needs. Items are grouped within an EC so that they are as homogeneous as possible with respect to their physical characteristics. It is not possible to confine groupings to items which are similar with respect to price movements.

Within an expenditure class base period expenditure weights will be held constant; that is, the EC expenditures serve as a way of defining the level of living which is to be held constant until the next major revision of the CPI. The Bureau plans to resample items within an EC between major revisions whenever there is evidence of a major redistribution of relative expenditures or indications that the previous sample of priced items does not adequately represent the class. The connotation of "item" in the sampling frame is necessarily fairly broad and the items are not of equal homogeneity in the different classes. Generally the listing is above that of the final "specified-in-detail" items for which prices are collected. For the most part no attempt has been made to carry probability sampling to this ultimate stage.

There were about 1,800 line items in the expenditure survey schedule. After extensive experimentation, using expenditure data from a 1959 pilot survey in Cincinnati, a final sampling frame containing 52 EC's and 812 items was developed. The list of EC's and the number of items in each are shown in table 3.

The first step in the selection of the item sample for the revised index was to make a roughly optimum allocation of the total number of items to be priced to each EC. Factors considered were the relative importances of the EC's and a rough measure of variability of price movement.

As in past revisions of the CPI, the samples were selected on a national basis. Selection of independent samples, city-by-city, is not practical since it would result in a huge list of items to be priced in at least one city and an impossible burden of writing and keeping up with changes in specifications.

The two replicated samples of items of the revised CPI have been selected with "probability proportional to size," size being defined as the relative importance of the expenditures for the item to total expenditures for all items. The general procedure was to array items within a stratum and by using a random start to make regular selections along the array. Each of the two replicated samples thus contains "certainty items;" that is, items which are certain of inclusion because their relative importance is greater than the selecting interval. The replicated samples also contain some duplicates of items selected but not with certainty. Table 4 contains a listing of the items priced in each sample.

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[17] The selection of the CES sample is discussed in chapter 8 of this bulletin.

For the final selection, relative importances (in the family expenditure pattern) for the condensed sampling frame (52 EC's and 812 items) were obtained from expenditure data for nine of the cities surveyed for 1960. Ideally, of course, the data should have covered all 66 cities, but such data were not available in time for use in selection of items. Expenditure data for these nine places were weighted together to give preliminary estimates of U.S. average expenditures. (Final index weights of course are based on complete data for all cities.)

The selection of one or more specifications or "specified-in-detail" items to represent the items selected from the sampling frame has been made in most cases by commodity specialists from expert knowledge of the item. Factors taken into consideration are the importance and representativeness of particular qualities and the feasibility of describing a selected item clearly enough to permit repetitive price collection. In a few cases where sufficient data existed, it is possible to make a second stage probability selection of specifications.

Outlet Sampling. The first big problem encountered in attempting probability sampling of outlets was to obtain information about the universe of retail and service establishments in a given area. Ideally, names and addresses of such places, information as to type of store or outlet, some indication of volume of sales, and preferably fairly specific information as to types of merchandise carried would have been desirable.

Comprehensive establishment data were obtained from a list of firms which report to the Bureau of Old-Age and Survivors Insurance (Social Security Administration, U.S. Department of Health, Education, and Welfare). Using sampling ratios furnished by BLS, master samples of retail and service outlets were selected by BOASI. These were supplemented with listings from other sources.

In the larger SMSA's, a two-stage sampling procedure has been followed. Samples of neighborhood and suburban localities and shopping centers have been selected in which pricing outside the downtown area is conducted. These were selected with probability proportional to sales volume, using the best available sales data. The listings of sample outlets were limited to those falling within the sampled areas.

The number of food stores priced varies from less than 10 in the smallest cities to about 80 in New York. The number of quotations for nonfood items per city is quite small; the basic number in each outlet sample is four. This means that for the cities in which both item samples are priced eight is the maximum sample size even for items appearing in both item samples. In a few "A" cities, the sample sizes are set at 5 per sample or a maximum of 10. At the U.S. level, however, the number of quotations is sizeable.

In selecting the sample, allocations of quotations were made for each item by type of outlet, based on available sales data, "where bought" surveys, etc. As a specific example, if eight quotations are required for a particular woman's shoe specification, the allocation might be three quotations to department stores, two to women's specialty shops, two to women's shoe stores, and one to family shoe stores. Specific allocations also are made by location within the SMSA (central business district, neighborhood centers, and suburbs) and, in some cases, to multiunit and independent establishments.

In addition to the pricing in regular retail and service outlets, there are a number of special items whose nature requires separate samples of specific types of "outlets;" for example, samples of physicians and other medical specialists, restaurants, dairies, hotels, property owners, etc. Each of these offers its own particular problems.

When the original samples, which were selected in Washington, were sent to the regional offices a great many practical problems were encountered, and many expedients and compromises with strict probability procedures were required to complete the initiation of pricing for the revised index. However, even though some deviations from probability sampling were inevitable and had been an-

TABLE 4. LIST OF ITEMS PRICED FOR THE REVISED CONSUMER PRICE INDEX AS OF DECEMBER 1963

Groups, subgroups, expenditure classes		Priced items	
		Sample A	Sample B
	Food:		
	Food at home:		
	Cereals and bakery products:		
EC-1	Cereals and grain products	Corn flakes	Flour, white, all-purpose.
		Rice, long and short grain	Cracker meal.
EC-2	Bakery products	White bread	White bread.
		Whole wheat bread	Cookies, cream filled.
		Layer cake, plain	Cinnamon rolls, frosted.
	Meats, poultry, and fish:		
EC-3	Meats:		
3A	Beef and veal	Hamburger, preground	Hamburger, preground.
		Steaks, round, bone-in	Steaks, round, bone-in.
		Steaks, porterhouse, bone-in	Steaks, sirloin, bone-in.
		Rump roasts, standing	Rump roasts, standing
		Chuck roasts, bone-in	Rib roasts, bone-in.
		Veal cutlets, bone-in	Beef liver, sliced.
3B	Pork	Pork chops, center cut	Pork chops, center cut.
		Bacon, sliced	Bacon, sliced.
		Pork roasts, loin halves	Pork roasts, loin halves.
		Picnics, smoked	Ham, whole.
3C	Other meats	Lamb chops, loin	Bologna sausage, sliced.
		Salami sausage, sliced	Liverwurst sausage, sliced or whole.
		Frankfurters, skinless	Ham, canned, domestic or imported.
EC-4	Poultry	Frying chickens, ready-to-cook	Frying chickens, ready-to-cook.
		Chicken breasts, fresh	Turkey, fresh or frozen.
EC-5	Fish	Fillets or steaks, fresh or frozen [1]	Shrimp, raw, frozen.
		Tuna fish, chunk style	Sardines, Maine.
EC-6	Dairy products	Milk, fresh, grocery	Milk, fresh, grocery.
		Milk, fresh, delivered	Milk, fresh, delivered.
		Milk, fresh, skim	Milk, evaporated, canned.
		Ice cream, prepackaged	Cheese, American process.
		Butter, salted	Butter, salted.
	Fruits and vegetables:		
EC-7	Fresh fruits	Apples, all purpose	Apples, all purpose.
		Bananas, yellow variety	Bananas, yellow variety.
		Oranges, except Temple or King	Oranges, except Temple or King.
		Grapes, Thompson seedless	Grapes, Thompson seedless.
		Grapefruit, fresh, pink or white	Strawberries, fresh.
		Orange juice, fresh	Watermelons, whole or sliced.
EC-8	Fresh vegetables	Head lettuce	Head lettuce.
		Potatoes, white	Potatoes, white.
		Tomatoes	Tomatoes.
		Asparagus, green	Cabbage, all varieties except red.
		Carrots, topped, prepackaged	Celery, Pascal, stalk.
		Cucumbers	Onions, yellow.
		Spinach, prepackaged	Peppers, sweet, green.
EC-9	Processed fruits and vegetables	Pears, Bartlett, can or jar	Fruit cocktail, canned.
		Lemonade, concentrate, frozen	Pineapple-Grapefruit juice drink, canned.
		Beets, sliced, can or jar	Orange juice concentrate, frozen.
		Tomatoes, can or jar	Peas, green, can or jar.
		Dried beans, Navy or Great Northern	Broccoli spears, frozen.
	Other foods at home:		
EC-10	Eggs	Eggs, fresh, large, Grade A	Eggs, fresh, large, Grade A.
EC-11	Fats and oils	Margarine, colored	Margarine, colored.
		Salad dressing, Italian	Salad or cooking oil, vegetable.
EC-12	Sugar and sweets	Sugar, white, granulated	Grape jelly, pure.
		Chocolate bar, plain milk	Chocolate flavored syrup.
EC-13	Nonalcoholic beverages	Coffee, can or bag	Coffee, can or bag.
		Carbonated drinks, fruit-flavored	Coffee, instant.
		Tea bags, orange pekoe and pekoe tea	Cola drink, carbonated.
EC-14	Prepared and partially prepared foods.	Bean soup, canned, condensed	Chicken soup, canned, condensed.
		Spaghetti, in tomato sauce, canned	Baby foods, strained.
		Mashed potatoes, instant	Sweet pickle relish.
		Potatoes, French fried, frozen	Pretzels, hard, salted.
EC-15	Food away from home	Restaurant meals:	Restaurant meals:
		Lunch	Lunch.
		Breakfast	Dinner.
		Between meal snacks:	Between meal snacks:
		Coffee, cup	Coffee, cup.
		Carbonated beverages, cup	Carbonated beverages, cup.
		Frankfurter on roll	Pie, slice.
		Ice cream, dish	Candy bar.
	Housing:		
	Shelter:		
EC-16	Rent	Rent of house or apartment	Rent of house or apartment.
		Hotel, motel room rates	Hotel, motel room rates.
	Homeownership:		
EC-17	Home purchase and financing	Home purchase	Home purchase.
		Mortgage interest rates	Mortgage interest rates.
EC-18	Taxes and insurance	Property taxes, residential	Property taxes, residential.
		Property insurance rates:	Property insurance rates:
		Fire and extended coverage	Fire and extended coverage.
		Comprehensive homeownership policy	Comprehensive homeownership policy.
	Maintenance and repairs:		
EC-19	Commodities	Exterior house paint	Interior house paint.
		Furnace air filters	Shelving, Ponderosa pine.
		Packaged dry cement mix	Shrubbery, evergreen.
EC-20	Services	Residing houses	Residing houses.
		Reshingling roofs	Repainting living and dining rooms.
		Replacing sinks	Repairing furnaces.

See footnotes at end of table.

TABLE 4. LIST OF ITEMS PRICED FOR THE REVISED CONSUMER PRICE INDEX AS OF DECEMBER 1963—Continued

Groups, subgroups, expenditure classes		Priced items	
		Sample A	Sample B
	Housing—Continued		
EC-21	Fuel and utilities	Fuel oil and coal:	
		Fuel oil, #2	Fuel oil, #2.
		Coal, anthracite or bituminous	Coal, anthracite or bituminous.
		Gas and electricity:	
		Gas, 3 bills per city	Gas, 3 bills per city.
		Electricity, 3 bills per city	Electricity, 3 bills per city.
		Other utilities:	
		Residential telephone services	Residential telephone services.
		Residential water and sewerage services	Residential water and sewerage services.
	Household furnishings and operation:		
EC-22	Textile housefurnishings	Pillows, bed, polyester or acrylic filling	Sheets, percale or muslin.
		Curtains, tailored, polyester marquisette	Bedspreads, chiefly cotton, tufted.
		Drapery fabric, cotton or rayon/acetate	Slipcovers, ready-made, chiefly cotton.
EC-23	Furniture	Bedroom suites, good or inexpensive quality	Bedroom suites, good or inexpensive quality.
		Living room suites, good and inexpensive quality	Living room suites, good and inexpensive quality.
		Lounge chairs, upholstered	Dining room suites.
		Sofas, dual purpose	Sofas, standard, upholstered.
		Sleep sets, Hollywood bed type	Box springs.
		Aluminum folding chairs	Cribs.
EC-24	Floor coverings	Rugs, soft surface:	Rugs, soft surface:
		Broadloom, wool	Broadloom, wool.
		Broadloom, nylon	Broadloom, nylon.
		Rugs, hard surface	Tile, vinyl.
EC-25	Appliances	Refrigerators or refrigerator-freezers, electric	Refrigerators or refrigerator-freezers, electric.
		Washing machines, electric, automatic	Washing machines, electric, automatic.
		Ranges, free standing, gas or electric	Vacuum cleaners, cannister type.
		Clothes dryers, electric, automatic	Air conditioners, demountable.
		Room heaters, electric, portable	Garbage disposal units.
EC-26	Other housefurnishings	Dinnerware, earthenware	Flatware, stainless steel.
		Carpet sweepers, manually operated	Table lamps, with shade.
		Venetian blinds, white, steel or aluminum slats	Lawn mowers, power, rotary type.
		Electric drills, hand held	Nails, 8d (penny) common.
EC-27	Housekeeping supplies	Detergent, liquid, laundry	Detergent, granules or powder.
		Laundry soap for fine fabrics	Air deodorizers, spray type.
		Scouring pads, steel wool	Paper napkins, embossed.
		Toilet tissue	Stationery, envelopes.
EC-28	Housekeeping services	Domestic service, general housework	Domestic service, general housework.
		Baby sitter service	Baby sitter service.
		Postal services	Postal services.
		Laundry flatwork, finished service	Laundry flatwork, finished service.
		Licensed day care service, preschool child	Reupholstering furniture.
		Washing machine repairs	Moving expenses.
	Apparel and upkeep:		
	Men's and boys' apparel:		
EC-29	Men's apparel	Suits, year round weight, 2 qualities	Suits, year round weight, 2 qualities.
		Topcoats, wool	Jackets, lightweight.
		Suits, tropical weight	Trousers, work, cotton.
		Slacks, wool or wool blend	Slacks, cotton or manmade blend.
		Shirts, work, cotton	Shirts, business, cotton.
		Shirts, sport, cotton, short sleeves	Socks, cotton.
		Shirts, sport, cotton, long sleeves	Handkerchiefs, cotton.
		T-shirt	
EC-30	Boys' apparel	Coats, all purpose, cotton or cotton blend	Sport coats, wool or wool blend.
		Dungarees, cotton or cotton blend	Undershorts, cotton.
	Women's and girls' apparel:		
EC-31	Women's apparel	Coats, heavyweight, wool or wool blend, 2 qualities.	Coats, heavyweight, wool or wool blend, 2 qualities
			Coats, lightweight, topper.
		Carcoats, heavyweight, cotton	Sweaters, wool or acrylic.
		Skirts, wool or wool blend	Dresses, cocktail, street length.
		Skirts, cotton or cotton blend	Dresses, street, chiefly manmade fiber, 2 qualities.
		Dresses, street, chiefly manmade fiber, 2 qualities	Dresses, street, wool or wool blend.
		Dresses, street, wool or wool blend	Dresses, street, cotton.
		Dresses, street, cotton	Blouses, cotton.
		Housedresses, cotton	Bathing suits, one piece.
		Slacks, lightweight, cotton and carded cotton	
		Slips, nylon	Girdles, manmade blend.
		Brassieres, cotton	Panties, acetate.
		Hose, nylon, full fashioned and seamless, 2 styles	Hose, nylon, full fashioned and seamless, 2 styles.
		Anklets, cotton	Gloves, fabric, nylon or cotton.
		Handbags, rayon faille or plastic	
EC-32	Girls' apparel	Raincoats, vinyl plastic or chiefly cotton	Coats, lightweight, topper.
		Skirts, wool or wool blend	Slacks, cotton.
		Slips, cotton blend	Shorts, cotton.
		Handbags, plastic	Dresses, cotton.
			Robes, duster style, quilted tricot, or percale.
EC-33	Footwear	Men's:	
		Shoes, street, oxford, 2 qualities	Shoes, street oxford, 2 qualities.
			Shoes, work, high.
		Women's:	
		Shoes, street, pump, 2 styles	Shoes, street, pump, 2 styles.
		Shoes, evening, pump	Shoes, evening, pump.
		Shoes, casual, pump	
		Houseslippers, scuff	
		Children's:	
		Sneakers, boys', oxford type	Shoes, oxford.
			Dress shoes, girls', strap.
	Other apparel:		
EC-34	Commodities	Diapers, cotton gauze	Wrist watches, men's, imported movement.
		Yard goods, cotton	Wrist watches, women's, imported movement.
		Earrings, Pearl, simulated or imitation	Zipper, skirt or neck placket.
EC-35	Services	Dry cleaning, men's suits and women's dresses	Dry cleaning, men's suits and women's dresses.
		Shoe repairs, women's heel lift	Automatic laundry service.
		Laundry, men's shirts	Tailoring charges, hem adjustment.

See footnotes at end of table.

TABLE 4. LIST OF ITEMS PRICED FOR THE REVISED CONSUMER PRICE INDEX AS OF DECEMBER 1963—Continued

Groups, subgroups, expenditure classes		Priced items	
		Sample A	Sample B
	Transportation:		
	Private:		
EC-36	Auto purchase	New cars:	
		Chevrolet, Impala, 2-door, hardtop	Chevrolet, Impala, 2-door hardtop.
		Chevrolet, Chevelle, 2-door hardtop	Ford, Falcon, Futura, 4-door sedan.
		Ford, Galaxie 500, 2-door hardtop	Ford, Galaxie 500, 2-door hardtop.
		Plymouth, Fury III, 4-door sedan	Pontiac, Catalina, 4-door sedan.
		Rambler, Classic 660, 4-door sedan	Volkswagen, Deluxe, 2-door hardtop.
		Used cars:	
		2 years old, Chevrolet and Ford	2 years old, Chevrolet and Ford.
		3 years old......do	3 years old, Do.
		4 years old......do	4 years old, Do.
		5 years old......do	5 years old, Do.
EC-37	Gasoline and motor oil	Gasoline, regular and premium	Gasoline, regular and premium.
		Motor oil, premium	Motor oil, premium.
EC-38	Auto parts	Tires, tubeless, retread	Tires, tubeless, new.
	Automobile services:		
EC-39	Auto repairs and maintenance	Chassis lubrication, complete	Water pump replacement.
		Motor tune-up	Replacing muffler.
		Automatic transmission repair	Front end alignment.
EC-40	Other automobile expenses	Auto insurance rates, liability and physical damage.	Auto insurance rates, liability and physical damage.
		Auto financing charges [3]	Auto financing charges.[3]
		Auto registration and inspection fees	Auto registration and inspection fees.
		Driver's license fees	Driver's license feees.
		Parking fees, private and municipal	Parking fees, private and municipal
EC-41	Public transportation	Local transit fares	Local transit fares.
		Taxicab fares	Taxicab fares.
		Railroad fares, coach	Railroad fares, coach.
		Airplane fares, chiefly coach	Airplane fares, chiefly coach.
		Bus fares, intercity	Bus fares, intercity.
	Health and recreation:		
	Medical care:		
EC-42	Drugs and prescriptions	Over-the-counter items:	
		Multiple vitamin concentrates	Aspirin compounds.
		Liquid tonics	Cough syrups.
		Cold tablets or capsules	Adhesive bandages, package.
		Prescriptions:	
		Anti-infectives:	
		Penicillin G buffered tablets	Tetracycline capsules.
		Sulfisoxazole tablets.	
		Sedatives and hynotics:	
		Phenobarbital tablets	Secobarbital sodium capsules.
		Ataractics:	
		Chlordiazepoxide-hydrochloride capsules	Meprobamate tablets.
		Antispasmodics:	
		Propantheline Bromide tablets	Phenobarbital and belladonna extract.
		Cardiovasculars and antihypertensives:	
		Reserpine tablets	Crystalline digitoxin tablets.
			Chlorothiazide tablets.
		Antiarthritics	Prednisone, tablets.
		Cough preparations:	
		Terpin hydrate with codeine, elixir.	
EC-43	Professional services	Family doctor, office visits	Family doctor, office visits.
		Family doctor, house visits	Family doctor, house visits.
		Pediatric care, office visits	Obstetrical cases.
		Psychiatrists, office visits	Chiropractors and podiatrists, office visits.
		Routine laboratory tests	Herniorrhaphy, adult.
		Examination, prescriptions and dispensing of eyeglasses.	Examination, prescriptions and dispensing eyeglasses.
		Fillings, adult, amalgam, one surface	Fillings, adult, amalgam, one surface.
		Dentures, full upper	Extractions, adult.
EC-44	Hospital services and health insurance:		
	Hospital services	Daily service charges:	Daily service charges:
		Semiprivate room	Semiprivate room.
		Private room	Private room.
	Health insurance [3]	Hospital services:	Hospital services:
		Daily service charges, semiprivate room	Daily service charges, semiprivate room.
		Daily service charges, private room	Daily service charges, private room.
		Operating room	X-ray diagnostic series, upper G.I.
		Nonhospital services:	Nonhospital services:
		Family doctor, office visit	Family doctor, office visit.
		Surgeon's fees, tonsillectomy/adenoidectomy	Surgeon's fees, herniorrhaphy, adult.
			Obstetrical cases.
		Prescriptions and drugs	Prescriptions and drugs.
		Retained earnings (overhead)	Retained earnings (overhead).
	Personal care:		
EC-45	Toilet goods	Toothpaste, standard dentrifice	Toilet soap, hand milled.
		Hand lotions, liquid	Shaving cream, aerosol.
		Face powder, pressed	Deodorants, cream or roll-on.
		Cleansing tissues	Home permanent refills.
EC-46	Personal care services	Men's haircuts	Men's haircuts.
		Shampoo and wave sets, plain	Shampoo and wave sets, plain.
		Women's haircuts	Permanent waves, cold.

See footnotes at end of table.

TABLE 4. LIST OF ITEMS PRICED FOR THE REVISED CONSUMER PRICE INDEX AS OF DECEMBER 1963—Continued

Groups, subgroups, expenditure classes		Priced items	
		Sample A	Sample B
	Health andrecreation—Continued		
	Reading and recreation:		
	Recreation:		
EC-47	Recreational goods	TV sets, portable and console	TV sets, portable and console.
		Radios, portable and table models, AM band only	Radios, portable and table models, AM band only.
		TV replacement tubes	Tape recorders, portable.
		Sports equipment:	Sports equipment:
		Golf balls, liquid center	Fishing rods, fresh water spincast.
		Basketballs, rubber or vinyl cover	Bowling balls.
		Outboard motors	Phonograph records, stereophonic.
		Tricycles	Bicycles, boys', 26".
		Dolls	Movie cameras, 8 mm, fully automatic lens.
		Stuffed animal	Film, 35 mm, color.
		Dog food, canned and boxed	
EC-48	Recreational services	Indoor movie admissions:	Indoor movie admissions:
		Adult	Adult.
		Children's	Children's.
		TV repairs, picture tube replacement	Drive-in movie admissions, adult.
		Bowling fees, evening	Bowling fees, evening.
		Golf green fees	Film developing, black and white.
EC-49	Reading and education	Newspapers, street sale and delivery	Newspapers, street sale and delivery.
		College tuition and fees, undergraduate	College tuition and fees, undergraduate.
		Magazines, single copy and subscription	Paperback books, not school or technical.
		College textbooks, undergraduate	Piano lessons, beginner.
	Other goods and services:		
EC-50	Tobacco products	Cigarettes, nonfilter tip, regular size, pack	Cigarettes, nonfilter tip, regular size, carton.
		Cigarettes, filter tip, king size, carton	Cigarettes, filter tip, king size, pack.
		Cigars, domestic, regular size	Cigars, domestic, regular size.
EC-51	Alcoholic beverages	Beer, at home, local and national brands	Beer, at home, local and national brands.
		Whiskey, spirit blended and straight bourbon	Whiskey, spirit blended and straight bourbon.
		Wine, dessert and table	Wine, dessert and table.
		Beer, away from home	Beer, away from home.
EC-52	Financial and miscellaneous personal expenses.	Funeral services, adult	Funeral services, adult.
		Bank service charges, checking account	Legal services, short form will.

[1] Two of the largest volume sellers among the following types of fish are priced within each city, since within any given city, all varieties of fish are not available: Frozen ocean perch and haddock; fresh cod, catfish, king salmon, halibut, sole, and haddock.

[2] Not actually priced; imputed from priced items.

[3] Four items are priced only for health insurance: Operating room, X-ray, tonsillectomy, and retained earnings; prices for the remaining items are also included as directly priced professional and hospital services.

ticipated, the final samples adhere to the original basic structure to the maximum extent possible. As a result, the main benefits of probability sampling have been achieved: lack of bias, representation of different types of outlets, sections of each SMSA, etc.

Calculation Procedures

The index is a time series. As previously explained, it is a weighted average of price changes for a sample of priced items, expressed as a relative of avearge prices in a reference base as 100. Weights, which are based on annual consumer expenditures, are kept constant from month to month. The index measures changes as they occur. It is not adjusted for seasonal variation.[18]

The Bureau began publication of seasonally adjusted indexes in 1966, for selected components which show a significant seasonal pattern of price change.[19]

Formula. In the absence of major weight revisions, and ignoring the problems of sampling, the index formula is most simply expressed as:

$$(1) \qquad I_{t:o}=\frac{\Sigma(p_tq_o)}{\Sigma(p_oq_o)}\times 100$$

or by its algebraic equivalent, the dollar weighted average of price relatives:

$$(1a) \qquad I_{t:o}=\frac{\Sigma\left[(p_oq_o)\frac{p_t}{p_o}\right]}{\Sigma(p_oq_o)}\times 100$$

This is the customary, oversimplified way of writing a price index formula to show that the q's are held constant between major revisions. In actual practice, the basic data for weights are values which include allowances for unpriced items, and the current index is computed by a chain computation procedure, as shown below:

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[18] For a discussion of the problems involved in using varying seasonal weights, see "Use of Varying Seasonal Weights in Price Index Construction," by Doris P. Rothwell, in the *Journal of the American Statistical Association*, March 1958, pp. 66–77.

[19] Factors used to compute seasonally adjusted indexes are available on request.

$$I_{i:o}=\frac{\Sigma(p_{i-s}q_o)}{\Sigma(p_oq_o)}\times\frac{(p'_iq_a)}{(p'_{-s}q_a)}\times100 \tag{2}$$

where q is a derived composite of the annual quantities purchased in a weight base period for a bundle of goods and services to be represented by the specific item priced

p and p' are the average prices of the specific commodities or services selected for pricing (the superscript indicates that the average prices are not necessarily derived from identical samples of outlets and specifications over long periods)

$i-s$ is the month preceding a weight revision (most recently, December 1963)

i is the current month

a is the period of the most recent Consumer Expenditure Survey (1960–61) from which the revised weights are derived

o is the reference base period of the index (1957–59).

The (p_oq_o) or $(p'_{i-s}q_a)$ base "weights" for a given priced item are the average annual expenditures in a weight base period represented by that item and other similar non-priced items. Although constant physical weights are implicit in the index, in reality the constant q's are not calculated separately.

In actual practice, the base expenditure for each item is projected forward for each pricing period by the price relative for the priced item:

$$(p_iq_a)=(p_{i-1}q_a)\left(\frac{p_i}{p_{i-1}}\right)$$

In practice, then, the index formula is as follows:

$$I_{i:o}=\overset{\text{(Dec. 1963 Index)}}{\frac{\Sigma(p_{i-s}q_o)}{\Sigma(p_oq_o)}}\times\overset{\text{(Change from Dec. 1963 to month } i-1\text{)}}{\frac{\Sigma(p'_{i-1}q_a)}{\Sigma(p'_{i-s}q_a)}} \tag{3}$$

$$\times\overset{\text{(Change from month } i-1 \text{ to month } i\text{)}}{\frac{\Sigma(p'_{i-1}q_a)\left(\frac{p'_i}{p'_{i-1}}\right)}{\Sigma(p'_{i-1}q_a)}}\times100$$

Illustrative Calculation. Average price changes from the previous pricing period to the current month are expressed as relatives (or ratios) for each item, and the price changes for the various goods and services are combined, using weighting factors based on the importance of the item in consumer spending and that of other items which it represents. This composite importance is called the cost weight of the market basket item. There is a set of separate cost weights for each of the 56 urban locations included in the index. The following hypothetical example for pork illustrates the index procedure:

Sample item	September price	October price	Ratio October ÷ September	September cost weight	October cost weight (Sept. × ratio)
Pork chops	$0.75	$0.7725	1.03	$15.00	$15.45
Ham	.80	.82	1.025	8.00	8.20
Bacon	1.00	1.02	1.02	10.00	10.20
Total				33.00	33.85

Identical results could be obtained for pork by multiplying prices each period by the implied physical quantities included in the market basket, as the following illustrates.

Sample item	Implied quantity (pounds)	September price	September cost weight	October price	October cost weight
Pork chops	20	$0.75	$15.00	$0.7725	$15.45
Ham	10	.80	8.00	.82	8.20
Bacon	10	1.00	10.00	1.02	10.20
Total			33.00		33.85

The average change in pork prices is computed by comparing the sum of the cost weights in October with the comparable sum for September, as follows:

$$\frac{\text{October cost weight}}{\text{September cost weight}}\;\frac{\$33.85}{\$33.00}\times100=102.6$$

This means that pork prices in October were 102.6 percent of (or 2.6 percent higher than) pork prices in September.

Although the second method may appear simpler, in reality it is not. Deriving the implied quantity weights is an extra operation, and these implicit quantities change as revised samples are linked in. Furthermore, the second formulation greatly complicates the handling of the numerous substitutions of reporters and items which occur constantly in repetitive index work. Consequently, the first method is the one actually used for the CPI. The second illustration, however, may assist the user to understand the meaning of the index mechanism.

After the cost weights for each of the items have been calculated, they are added to area totals for commodity groups and all items. The U.S. totals are obtained by combining area totals, with each area total weighted according to the proportion of the total wage-earner and clerical-worker population which it represents in the index based on 1960 Census figures. Finally, the U.S. totals for the current and previous months are compared to compute the average price change.

Reference Base Period. Since 1962 the index has been calculated on the reference base of 1957–59=100.[20] This means that current prices are expressed as a percentage of prices for the average of the 3 years—1957, 1958, and 1959. An index of 110 means that prices have increased 10 percent since the base period; similarly, an index of 90 means a 10-percent decrease. The index can be converted to any desired base period for which the index is available. This is done by dividing each index number to be converted by the index for the desired base period. Tables of conversion factors are provided on request for most series, enabling users to convert indexes for prior periods on other bases to the current 1957–59 base. Since the 1957–59 base was adopted in 1962, some indexes have been continued on the bases of 1947–49=100 and 1939=100. These are calculated by the application of appropriate conversion factors to indexes computed on the 1957–59 base.

Imputation Procedures. Although prices are not obtained in all 56 cities every month (see table 1 for pricing cycle), it is necessary to represent all 56 cities in each monthly index computation. Between quarterly survey dates, for every item except new automobiles, the weights are held at the level of their last pricing, which in effect means prices are estimated unchanged. For new automobiles, a price change is imputed to the unpriced cities on the basis of changes in cities surveyed every month

For food and apparel items which are sold only at certain seasons of the year, the index calculation is made in the off-season as if prices of these items changed proportionally with prices of items of a similar nature which are available all year. For example, prices for strawberries when not in season are carried forward on the basis of changes in prices of all other fresh fruits. When the item returns to the market the current price is, in effect, compared with the estimated price implicit in the procedure described.

Average Prices. In the calculation of average food prices for publication, the prices used in the index are given special editing since they are not necessarily restricted to a single specified quality and size. Procedures have been devised to calculate city and U.S. prices for publication which use index values and price relatives extensively. These procedures employ benchmark prices for defined specifications for each of the 56 cities, in which quotations not meeting the specified quality are excluded. Benchmark prices are computed in an independent operation, pooling prices for all outlets rather than as an average of average prices for the two subsamples. The benchmark prices are then adjusted month by month by the price changes reflected in the index. The first benchmark calculation was for April 1964, from which date prices were estimated back to December 1963 and forward to December 1964. New benchmark calculations are planned as of each January. City prices are combined to U.S. averages by the use of the 1960 index population weights.[21]

Average bills for specified quantities of gas and electricity and average prices of fuel oil, which are published for the largest cities, are the same as those used in the index calculation. Since these are for identical quantities and qualities from month to month, no special editing is required.

Item Indexes. Indexes for selected items and groups (commonly referred to as item indexes), were published semiannually during 1964 and 1965. Quarterly publication was resumed in 1966. Although the published indexes refer to March, June, September, and December, some prices for earlier months must be used in their calculation for cities not priced in these months. In June, for example, the indexes are based on (a) June prices in the 5 cities surveyed every month and the 17 cities surveyed in June on a quarterly cycle; and (b) April and May prices in the 17 cities surveyed in each of those months on a quarterly cycle, carried forward to June as in the composite index calculation.

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[20] The index base was 1947–49=100 from 1953 through 1961, 1935–39=100 from 1935 through 1952, and 1913=100 from 1913 through 1934.

[21] For a more detailed discussion, see article by Doris P. Rothwell, "Calculation of Average Retail Food Prices," *Monthly Labor Review*, January 1965, pp. 61–66.

Analysis and Presentation

The CPI is made available first at a press conference, usually held near the end of the month following that to which the data relate. On the same day, the press release is mailed to a list of subscribers who have immediate need for the data. This release contains a brief description of price changes during the month and several tables of major group and subgroup indexes and percentage changes from selected dates, for the U.S. city average and selected large metropolitan areas. It includes seasonally adjusted indexes for selected components. A report containing the same text with some additional tables is published about two weeks after the date of the press release. In addition each of the Bureau's six regional offices prepares and mails a press release for each of the cities in its region for which CPI figures are published. These releases are timed to coincide with the national release. Other monthly reports contain average prices of selected foods and fuels in the largest metropolitan areas. A quarterly publication presents the U.S. city average indexes for individual goods and services.

The CPI for the United States and for selected areas is published also in the *Monthly Labor Review* in the issue dated two months later than the index. The annual Statistical Supplement to the *Monthly Labor Review* contains indexes for individual goods and services (item indexes) as well as the relative importance of the items in the total index as of December.

Average prices for foods and fuels are published in *Estimated Retail Food Prices by Cities* and *Retail Prices and Indexes of Fuels and Electricity.*

Uses of the Index

The most widespread use of the CPI is in wage adjustments and collective bargaining negotiations. Although this was the primary reason for its beginning, use of the CPI for this purpose declined during the post-World War I and depression periods. Its use in this way was revived during World War II, but escalation by the index did not receive widespread acceptance until the principle was written into a contract between the United Automobile, Aircraft, and Agricultural Implement Workers of America and the General Motors Corporation in 1948. The number of workers covered by such contracts in 1965 was about 2 million. However, movements of the index have an indirect effect on wages and salaries of many more workers.[22]

The CPI is used extensively to measure changes in purchasing power of the consumer dollar. It is the basis for most estimates of changes in real earnings of labor, and for comparison with productivity measures. Changes in purchasing power are used for such diverse purposes as adjusting royalties, pensions of government and non-government workers, welfare payments, rental contracts, and occasionally alimony payments.

One of the most important uses of the index is as a guide to broad economic policy. It is one of the most widely used measures of inflationary pressures. During wartime periods the index and its components have served an important administrative function in connection with determination of policies concerning price control and subsidies. In peacetime the index and its underlying statistics have played an important part in the government's effort to maintain stable wage-price relationships and to judge the advisability of making monetary or tax adjustments. It is one of the chief statistical tools for conversion of the national accounts to constant dollars.

Limitations of the Index

The CPI is not an exact measure of price changes. It is subject to sampling errors which may cause it to deviate somewhat from the results which would be obtained if actual records of all retail purchases by wage earners and clerical workers could be used to compile the index. These estimating or sampling errors are limitations upon the precise accuracy of the index rather than mistakes in the index calculation. The accuracy could be increased by using much larger samples, but the cost is prohibitive. Furthermore, the index is believed to be sufficiently accurate for most of the practical uses made of it. With the changes in sampling techniques introduced in 1964, the Bu-

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[22] See article by Francis S. Cunningham, "The Use of Price Indexes in Escalator Contracts," *Monthly Labor Review*, August 1963, pp. 948–952. Reprint 2424.

TABLE 5. SUMMARY OF CHARACTERISTICS OF THE CPI BEGINNING 1964

DEFINITION OF THE INDEX	
Title	Consumer Price Index—U.S. City Average for Urban Wage Earners and Clerical Workers.
Formula (Simplified expression)	$I_{t:o}=I_{t-1:o}\frac{\Sigma(p_{t-1}q_o)\left(\frac{p_t}{p_{t-1}}\right)}{\Sigma p_{t-1}q_o}$
Base period	1957–59=100. Series also published on 1947–49 and 1939 bases.
Duration	January 1964 forward.
Definition of index expenditure weights	Average expenditures for urban wage-earner and clerical-worker consumers (including single workers) derived from the 1960–61 Consumer Expenditure Survey in 66 urban places, adjusted for price changes between the survey dates and 1963 except for 6 cities added in 1966.
POPULATION COVERAGE OF EXPENDITURE SURVEY	
Place of residence	Urban places of 2500 or more in 1960; including Alaska and Hawaii.
Family size	No restriction; single consumer units included.
Occupation	Wage-earner and clerical-worker families and single individuals living alone. (More than half of total family income from wage-earner and clerical-worker occupations.)
Length of employment	At least 1 family member or single consumer unit must have been employed for 37 weeks or more during the survey year in wage-earner or clerical-worker occupations.
Income	No criterion as to income except the qualification above.
CITY COVERAGE	
Population weights	Based on 1960 Population Census; Alaska and Hawaii included. Proportion of population in wage-earner and clerical-worker group covered by index was based upon BLS expenditure surveys.
Sample of priced cities	50 metropolitan areas and cities selected originally to represent all urban places in the U.S. including Alaska and Hawaii with populations of 2500 or more in 1960. Six additional areas added in 1966.
Published indexes	U.S. and 17 large metropolitan areas for families and single consumer units combined. Indexes for six more large metropolitan areas available in the latter part of 1965.
ITEM SAMPLE	
Basis of sample selection	Probability proportionate to importance in family spending.
Basis for allocation to priced items	Expenditures classified into 52 expenditure classes. Certainty items assigned their own importance; remainder of expenditures assigned equally to probability selections within expenditure classes.
Commodity coverage	Goods and services purchased for family living, including necessities and luxuries; excluding personal insurance, income and personal property taxes but including real estate taxes and sales and excise taxes.
Number of items priced	About 400 represented in U.S. index and published city indexes. Certainty items priced in all unpublished cities; other items in 1 of 2 subsamples of unpublished cities.
Pricing cycle	Prices of foods, fuels and a few other items priced monthly in all cities, except for San Diego and Milwaukee where all items are priced quarterly. Prices of most other commodities and services priced monthly in the 5 largest cities, and quarterly in remaining cities.
REPORTER COVERAGE	
Location	In central cities and selected suburbs of 56 metropolitan areas (50 areas in 1964 and 1965).
Number of reporters	About 1,775 food stores (1,525 for 50 areas), 40,000 tenants (34,000 for 50 areas), 16,000 other reporters of all kinds (15,000 for 50 areas).
Number of quotations	Over 1 million food prices per year; about 80,000 rent charges per year (68,000 for 50 areas); about 375,000 quotations per year for items other than food and rent (350,000 for 50 areas).
Pricing technique	Personal visit of BLS agent except for a few items collected by mail or from secondary sources. Specification pricing but agent is permitted to price deviations from specification under prescribed conditions.

reau is attempting to measure the sampling error in the index.[23]

Another kind of error occurs because people who give information do not always report accurately. The Bureau makes every effort to keep these errors to a minimum, obtaining prices wherever possible by personal observation, and corrects errors whenever they are discovered subsequently. Precautions are taken to guard against errors in pricing, which would affect the index most seriously. The field representatives who collect the price data and the commodity specialists and clerks who process them are well trained to watch for unusual deviations in prices which might be due to errors in reporting.

The CPI represents the average movement of prices for urban wage earners and clerical workers as a broad group, but not the change in prices paid by any one family or small group of families. The index is not directly applicable to any other occupational group or to non-urban workers. Some families may find their outlays changing because of changes in factors other than prices, such as family composition. The index measures only the change in prices and none of the other factors which affect family living expenses.

In many instances, changes in quoted prices are accompanied by changes in the quality of consumer goods and services. Also new products are introduced frequently which bear little resemblance to products previously on the market; hence, direct price comparisons cannot be made. Quoted prices are adjusted for changes in quality, whenever necessary data are available. Technical specifications and highly trained personnel are relied on to insure comparability of quality of items compared from period to period.[24] Nevertheless, some residual effects of quality changes on quoted prices undoubtedly do affect the movement of the CPI either downward or upward from time to time.[25]

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[23] Preliminary estimates of sampling error were computed and published in *Measurement of Sampling Error in the Consumer Price Index: First Results*, by Marvin Wilkerson, paper presented at American Statistical Association meetings, December 29, 1964. Additional estimates will be made available as work continues on this project.

Another important limitation of the index is that it measures only time-to-time price change in a given area. City indexes do not show intercity differences in either prices or living costs. They show only differences in rates of price change from one time to another. Other types of measures are required to show place-to-place differences in living costs. The most recent such measure is "The Interim City Worker's Family Budget" which shows the estimated dollar costs of a "modest but adequate" level of living in 20 large cities and their suburbs in the fall of 1959, which is described in Chapter 9.

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[24] Hoover, Ethel D., "The CPI and Problems of Quality Change," *Monthly Labor Review*, November 1961, pp. 1175–1185. Reprint 2378, and Larsgaard, Olga A., and Louise J. Mack, "Compact Cars in the Consumer Price Index," *Monthly Labor Review*, May 1961, pp. 519–523. Reprint 2368.

[25] See testimony of Ewan Clague in *Hearings before the Subcommittee on Economic Statistics*, Joint Economic Committee, Congress of the United States, 87/1, Part II, p. 588, Washington, May 1, 2, 3, 4, and 5, 1961.

Technical References

Number

1. Cunningham, Francis S. "The Use of Price Indexes in Escalator Contracts," *Monthly Labor Review*, August 1963, pp. 948–952. Reprint No. 2424.

   Discusses the techniques of escalation using the two major price indexes published by the Bureau of Labor Statistics—the Consumer Price Index (CPI) and the Wholesale Price Index (WPI). Examines the basic elements of an escalator clause and procedures for carrying out the agreement.

2. Daugherty, James C. "Health Insurance in the Revised CPI," *Monthly Labor Review*, November 1964, pp. 1299–1300.

   Explains and justifies the major change in the treatment of the health insurance component of medical care as initiated in the recent revision of the Consumer Price Index. Compares the former method of pricing actual premium rates with the new method of pricing the benefits received for hospital and professional services combined with a measurement for retained earnings.

3. Hoover, Ethel D. "The CPI and Problems of Quality Change," *Monthly Labor Review*, November 1961, pp. 1175–1185.

   Explains and illustrates problems of quality measurement met in the index calculation procedures. Defines quality as used by the BLS, specification pricing, direct price comparisons, and linking procedures. Concludes that there is no evidence to support the argument that the index is not a true measure of price change because of not fully eliminating the effect of quality changes.

4. Humes, Helen and Schiro, Bruno. "The Rent Component of the Consumers' Price Index. Part I—Concept and Measurement," *Monthly Labor Review*, December 1948, pp. 631–637. "The Rent Component of the Consumers' Price Index. Part II—Methodology of Measurement," *Monthly Labor Review*, January 1949, pp. 60–68. Combined in Reprint No. 1947.

   Part I discusses the basic concepts underlying the rent index. Part II explains the methods of obtaining and calculating rental data, the "new unit bias" which existed during World War II and the problem of compensating for depreciation of quality caused by aging.

5. Jaffe, Sidney A. "The Statistical Structure of the Revised CPI," *Monthly Labor Review*, August 1964, pp. 916–924.

   Describes the concept and formulation, population and expenditure coverage, statistical techniques and problems of the revised index. Examines some operational aspects, especially sample replication. Presents the index formula in general, simplified, and in operational form.

6. ——. *The Consumer Price Index—Technical Questions and Practical Answers.* Paper presented before the American Statistical Association Meeting, Washington, D.C., December 30, 1959 (Mimeographed by the U.S. Department of Labor, Bureau of Labor Statistics). 27 pp.

   General explanation and definition of the index concepts, coverage and calculation. Discussion of problem areas including sampling, seasonality, and alleged quality bias.

Technical References—Continued

Number

7. Lamale, Helen Humes. "Housing Costs in the Consumer Price Index, Part I," *Monthly Labor Review*, February 1956, pp. 189–196. "Housing Costs in the Consumer Price Index. Part II, *Monthly Labor Review*, April 1956, pp. 442–446. Combined in Reprint No. 2188.

   Part I defines the housing component of the index and describes the derivation of expenditure weights used in the calculation of the shelter index. Part II describes the procedures used to measure changes in the prices of the various items of shelter cost.

8. Larsgaard, Olga A. and Mack, Louise J. "Compact Cars in the Consumer Price Index," *Monthly Labor Review*, May 1961, pp. 519–523. Reprint No. 2368.

   Summarizes and explains the methodology used to link compact cars into the Consumer Price Index in 1961. Discusses the historical treatment of quality changes in standard size cars.

9. National Bureau of Economic Research. *The Price Statistics of the Federal Government: Review, Appraisal, and Recommendations*, (Washington, National Bureau of Economic Research, General Series, Number 73, 1961), 496 pp. Also appears in *Government Price Statistics: Hearings*, Subcommittee on Economic Statistics of the Joint Economic Committee, 87th Cong., 1st sess., Part 1, January 24, 1961, ([Washington,] U.S. Government Printing Office, 1961), 526 pp.

   Report of the detailed investigation by the Price Statistics Review Committee of the NBER in 1959 of the main price indexes compiled by the Federal Government: The Consumer Price Index; the Wholesale Price Index; and the Indexes of Prices Received and Paid by Farmers. Reviews and analyzes the various aspects of the indexes and presents general and specific recommendations for improvements. Twelve staff reports appended.

10. Rothwell, Doris P. "Calculation of Average Retail Food Prices," *Monthly Labor Review*, January 1965, pp. 61–66.

    Explains the BLS methods of collecting prices, and computing indexes and avreage prices for food items in the index. Emphasizes the unsuitable nature of index data for comparison of prices between cities. Presents estimated retail prices of food from December 1963 through November 1964, the cities covered, and the pricing diagram for food in the index.

11. ——. *The Consumer Price Index: Pricing and Calculation Procedures*, (Unnumbered paper, U.S. Department of Labor, Bureau of Labor Statistics, March 1964), 22 pp.

    Discusses sampling, pricing by specification; price collection, processing, and editing. Describes index formula, calculation of price relatives, expenditure weights, indexes, aggregation, and correction policy.

12. ——. "Use of Varying Seasonal Weights in Price Index Construction," *Journal of the American Statistical Association*, March 1958, pp. 66–77.

    Describes a formula based on varying seasonal weights for month-to-month measurements of price change which does not exhibit the "biases" of chain indexes and which satisfies classical index theory with respect to year-to-year comparisons. Results of experimentation with alternative formulas are presented.

13. U.S. Congress, House of Representatives, Committee on Education and Labor. *Consumers' Price Index*, Special subcommittee of the Committee on Education and Labor, 82nd Cong., 1st sess., Report No. 2 (1951), 39 pp.

    Nontechnical summary of results of hearings on the reliability of the Consumer Price Index. Presents details of history, uses, and method of construction of the index. Recommends continued support of the index by the Congress.

14. U.S. Congress, Joint Economic Committee. *Government Price Statistics: Hearings*, Subcommittee on Economic Statistics, 87th Cong., 1st sess., Part I, January 24, 1961 (Washington, U.S. Government Printing Office, 1961), 526 pp. Part 2, May 1, 2, 3, 4, and 5, 1961. (1961), 265 pp.

    Part 1 presents findings of an investigation by the Price Statistics Review Committee of the National Bureau of Economic Research in 1959–60 of all government price statistics. Also includes 12 staff papers on specific subjects. The detailed technical report includes recommendations for improvement of all indexes and, specifically for the Consumer Price Index, suggests extended coverage to include single consumers, probability sampling techniques, establishment of a research division, and regularly scheduled weight revisions. Part 2 presents testimony before the subcommittee of members of the Price Statistics Review Committee, government officials, and other interested parties concerning the committee report and recommendations.

Technical References—Continued

Number

15. U.S. Congress, Joint Committee on the Economic Report. *The Consumers' Price Index—Report of the Joint Committee on the Economic Report on the Consumers' Price Index of the United States Bureau of Labor Statistics*, 80th Cong., 2nd sess. (1949), 20 pp.

    Brief statement of the results of examinations of methodology, compilation, composition, and presentation of the Consumer Price Index as of 1949. Extensive bibliography.

16. U.S. Department of Labor, Bureau of Labor Statistics. *The Consumer Price Index (Revised January 1964): A Short Description*, (U.S. Department of Labor, Bureau of Labor Statistics, September 1964).

    A nontechnical description of the index, its scope and computation. Explains the market basket, formula, uses and limitations of the index. Tables show cities included, population weights, pricing schedules, groups of goods and services priced, their relative importance, and the number of items priced as of December 1963.

17. ——. *Seasonal Factors, Consumer Price Index: Selected Series, June 1953–May 1961*, Bulletin 1366 (1963), 47 pp.

    Provides basic data with which Consumer Price Index old series indexes can be adjusted for seasonal variation. Users are cautioned that the 1964 revision may have a very different effect on the series. Includes a description of the BLS method of computing seasonal factors, a discussion of its application to consumer price series, comments on specific series and tables providing indexes and seasonal factors for 66 selected series through May 1961.

18. ——. "Taxes and the Consumers' Price Index," *Monthly Labor Review*, January 1953, pp. 53–57. Reprint No. 2090.

    Discusses the present treatment of taxes in the index and the specific taxes included. Justifies the BLS policy of continuing to exclude income taxes from the index and including sales and excise taxes.

19. ——. *Interim Adjustment of Consumers' Price Index: Correction of New Unit Bias in Rent Component of Consumers' Price Index and Relative Importance of Items*, Bulletin 1039 (1952), 49 pp.

    Military developments in Korea in 1950 emphasized and made urgent the need for reweighting of certain segments of the index before the already initiated revision could be completed in 1952. The failure to reflect the difference between rents for new dwellings when they first enter the market and comparable dwellings already on the market during and after the Second World War is discussed and the method of adjustment presented. Tabulation of adjusted indexes from 1940–50, relative importances and weights generated by the interim adjustment also are presented.

20. ——. *Consumer Prices in the United States, 1953–58: Price Trends and Indexes*, Bulletin 1256, (1959), 126 pp.

    Analyzes and explains retail price trends and their effect on the economy from 1953 to 1958. Brief history of the index and comparison of features of the old index based on the 1934–36 expenditures survey, with the adjusted index based on the 1947–49 expenditures survey in 7 cities and the revised index based on the 1950 expenditures survey. Explains the 1952 revision in detail. Presents historical indexes for various segments of the index.

21. U.S. Office of Economic Stabilization. *Report of the President's Committee on the Cost of Living*, (1945), 423 pp.

    Summarizes the findings of the investigation in 1943–44 of the suitability of the Consumer Price Index for measurement of the change in the cost of living during wartime. Includes detailed discussions of the definition, scope, and statistical methodology of the index.

22. Wilkerson, Marvin. *Measurement of Sampling Error in the Consumer Price Index: First Results.* Paper presented at the American Statistical Association meeting, Washington, D.C., December 1964 (mimeographed by the U.S. Department of Labor, Bureau of Labor Statistics), 16 pp.

    With the computation of the Revised Consumer Price Index, completed in 1964, a first attempt was made to produce estimates of error for a comprehensive national price index. Presents a brief description of the replication design, estimates of error through October 1964. Discusses limitations of the error estimates and provides an interpretation of the results.

Technical References—Continued

Number

23. Wilkerson, Marvin. *Sampling Aspects of the Revised CPI* (Unnumbered paper, U.S. Department of Labor, Bureau of Labor Statistics, October 1964), 33 pp.

Explains two significant improvements in methodology made in the Consumer Price Index at the time of the most recent revision: (1) application of probability sampling, and (2) estimation of sampling error through a system of replicated samples. Tables present the sampling frame for selection of the index item sample and pairing of index cities for replication computations.

24. ——. "The Revised City Sample for the Consumer Price Index," *Monthly Labor Review*, October 1960, pp. 1078–1083. Reprint No. 2352.

Describes the selection procedures used to derive the core sample of 50 cities used in the revised Consumer Price Index computation. Tables show probability patterns for the selected areas and basic and alternate city samples for the Consumer Price Index and the Consumer Expenditures Survey.

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Chapter 11. Wholesale Prices

Background

The Wholesale Price Index (WPI) is the oldest continuous statistical series published by the Bureau of Labor Statistics (BLS) and one of the oldest in the Federal Government. It was first published in 1902, and covered the years 1890–1901. The origins of the index are associated with a resolution of the U.S. Senate in 1891, which authorized the Senate Committee on Finance to investigate the effects of the tariff laws "upon the imports and exports, the growth, development, production, and prices of agricultural and manufactured articles at home and abroad."[1]

The index published in 1902 on the base 1890–99 was an unweighted average of price relatives and included from 250 to 261 commodities. Since that time, many changes have been made in the sample of commodities, the base period, and in the method of calculating the index. The first major change was completed at the end of 1914, when a system of weighting was introduced and the index was recalculated back through 1890.[2] By 1940, the number of commodities had increased to approximately 900, based on about 2,000 individual price quotations. Then, in 1952, the most extensive revision in the history of the index was completed.[3] The number of commodities and quotations was doubled, weights were based on 1947 Censuses and changes were made in the calculation method. Some changes in classification were made also, including expansion to the present 15 major groups. A major reclassification was implemented in January 1967, when the 8-digit classification structure was initiated. Also at that time, new weights from the 1963 industrial censuses were introduced.

By January 1971, the number of commodities had increased to more than 2,500, the number of price quotations had increased to over 8,000, and the index had become increasingly representative of general primary market price changes.

Description of Survey

Concepts

Throughout its history, the WPI has been a measure of price changes for goods sold in primary markets in the United States. "Wholesale" as used in the title of the index refers to sales in large quantities, not prices received by wholesalers, jobbers, or distributors.

From its inception, the index has been considered a general purpose index designed to measure the general price level in other than retail markets. From the beginning of the index, however, attention was directed to some specific needs of users, and indexes for individual commodities and for major commodity groups were published. As early as 1903, two special group indexes by stage of processing—Raw Commodities and Manufactured Commodities—were published "to meet the wishes of students of price statistics." In recent years, emphasis has been placed on the development of more subdivisions within major groups and special combinations of indexes such as by stage of processing and by durability of product.

Most of the quotations reported to the Bureau are the selling prices of representative manufacturers or producers, but some prices are those quoted on organized exchanges (spot prices) or at central markets. Prices for imported commodities are those received by importers—the first commercial transaction involving the commodity in the United States. Since the index is intended to measure "pure" price change, that is, not influenced by changes in quality, quantity, shipping terms, product mix, etc., commodities included in the index are defined by precise specifications which incorporate their principal price-determining characteristics.[4] So far as possible, prices are f.o.b. production point, and refer to sales for immediate delivery. Prices applicable to long-run contracts and "futures" are usually not included.

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[1] *Wholesale Prices, Wages, and Transportation*, Senate Report No. 1394, "The Aldrich Report," Senate Committee on Finance, Congress of the United States, March 3, 1893, Part I, (52d Cong., 2d session), Government Printing Office (1893); and *Course of Wholesale Prices*, 1890–1901, Bulletin of the Department of Labor, No. 39, March 1902, pp. 205–209.

[2] See also, Allan D. Searle, "Weight Revisions in the Wholesale Price Index, 1890–1960," Monthly Labor Review, February 1962, pp. 175–182.

[3] A large number of the newly introduced commodity prices were carried back to 1947. The presently published index contains the new commodities for the period 1947–51 and displaces the older, less comprehensive index on the 1926 base published for the same period.

Universe

The WPI universe consists of all commodities sold in commercial transactions in primary markets of the United States, including Alaska and Hawaii. Commodities produced in the United States are included, as well as those imported for sale. The universe covers manufactured and processed goods and the output of industries classified as manufacturing, agriculture, forestry, fishing, mining, gas and electricity, public utilities, and goods competitive with those made in the producing sector, such as waste and scrap materials. All systematic production is represented, but individually priced items, such as works of art, are excluded. Also excluded are goods transferred between establishments owned by the same company (interplant or intra-company transfers). Goods sold at retail by producer-owned retail establishments also are excluded because they conceptually belong to a retail (consumers') universe, rather than to primary market transactions.

Civilian goods normally purchased by the Government are in the universe, but military goods are not. Government sales of some commodities (e.g., electric power) are included if they can be considered competitive with free market sales.

Prices

To the extent possible, the prices used in constructing the index are those that apply to the first significant commercial transaction in the United States. Transactions for the same item at later stages of distribution are not included. However, as raw materials are transformed into semifinished and finished goods, the resulting products are represented.

With some exceptions, the prices refer to one particular day of each month. In most cases, the pricing date is Tuesday of the week containing the 13th day; but for some commodities (farm products, particularly) a day other than Tuesday is used because it is considered more representative.[5]

The Bureau attempts to base the WPI on actual transaction prices. Companies are requested to report prices less all discounts, allowances, rebates, free deals, etc., so that the resulting net price is the actual selling price of the commodity for the specified basis of quotation. The Bureau periodically emphasizes to reporters the need to take into account all discounts and allowances. However, list or book prices are used if transaction prices are unobtainable.

Prices are generally f.o.b. production or central marketing point to avoid reflection of changes in transportation costs. Delivered prices are included only when the customary practice of the industry is to quote on this basis and the Bureau cannot obtain a price at the production point. Subsidies to the producer and excise taxes are excluded since they are not considered part of the price, but import duties are included as part of the selling price of imported goods.

Although the same commodity is priced generally month after month, it is necessary to provide a means for bridging over changes in detailed specifications (or descriptions of items priced) so that only real price change will be measured. An adjustment is particularly important when new commodities are introduced, but even when specifications of existing commodities are changed, care is exercised to help insure that only price changes influence the index. A new price series resulting from a physical change in an article or a change in its selling terms is substituted for the earlier series by direct comparison or by linking. The objective of the linking procedure is to insure that the index will reflect only those changes due to actual price differences.[6] Each time a change in the item priced occurs, the Bureau appraises the significance of the specification change to ascertain whether an actual price change occurred. If the specification change is minor and does not involve price-making factors, the substitution is effected by direct comparison, and any reported price change between the old and the new specification is reflected in the index. If changes in specification are major, and if either no real price change occurred or no information can be obtained concerning the value of the difference in specification (perhaps indicative of a change in quality), the substitution is made by linking and no change is reflected in the index. In this case, any reported difference in price level is not permitted to affect the index level.

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[4] An example of a commodity specification for steel strip is: "Strip, cold-rolled, carbon steel, coils, No. 4 temper, No. 2 finish, No. 3 edge, base chemistry, 6" x .050", in quantities of 10,000 to 19,999 lb., mill to user, f.o.b. mill, per 100 lb."

[5] The prices used in the index through 1951 were the simple arithmetic averages of prices for all Tuesdays in the month. From January 1952 through December 1966, Tuesday of the week containing the 15th was the pricing date.

When differences are major, an attempt is made to obtain data from the reporters on the value of the additional (or deleted) features and to adjust the price index accordingly. This is particularly important in the case of some durable goods, such as automobiles, which have periodic model changes. Also, price increases which result from the addition of features that formerly sold at extra cost are not reflected in the index. Conversely, price changes attributable to deletion of equipment which was formerly standard are not treated as decreases.

In the event production of a specified commodity is discontinued by a reporter, or its importance is reduced, the Bureau collects price data for a similar or a replacement item. Prices are obtained for the new and the discontinued series for a 1-month overlap period. The index is extended by linking, and the difference, if any, between the new item price and the original price is taken as a measure of the quality difference between the two items.

Linking is also used for the addition to or deletion of commodities or groups of commodities from the index; the addition to or deletion of a company report from the sample of companies priced, or, on occasion, a change in the source of price. Whenever a new commodity is added to an existing commodity group, linking of the new item to any one of the existing items is not pertinent. Instead, the weights of the entire group are redistributed to include the new item and the link is made at the group level instead of at the commodity level. A similar procedure is used to handle items that drop out of the index.

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[6] The following example illustrates the linking procedure: The September price for a certain machine used in the calculation of the index was $2,347.50. In October, a new model of the machine was introduced, priced at $2,562.60. The new model was considered essentially comparable with the old, except that it had a more powerful motor and larger tires. These were valued at $186.20 more than the value of those used on the former model. For linking, the September price of the new model was estimated at $2,533.70 ($2,347.50 September price of former model plus $186.20 increase in value of motor and tires). The price comparison between September and October was based on the estimated September price of $2,533.70 and the reported October price of $2,562.60. Thus a 1.1-percent increase was reflected in the October index, but the price change due to quality improvement (more powerful motor and larger tires) was not reflected.

WHOLESALE PRICE INDEX
RELATIVE IMPORTANCE, NUMBER OF ITEMS AND PRICE QUOTATIONS FOR MAJOR GROUPS AND SUBGROUPS

Grouping	Relative importance in total 1963 weights		Number of items and price quotations, January 1971	
	December 1970	December 1966	Items	Price quotations
All commodities	100.000	100.000	2,503	8,017
01 Farm products	10.038	10.637	101	143
01-1 Fresh and dried fruits and vegetables	1.176	1.171	30	48
01-2 Grains	1.198	1.357	8	8
01-3 Livestock	2.851	3.086	12	12
01-4 Live poultry	.255	.332	4	4
01-5 Plant and animal fibers	.437	.553	19	29
01-6 Fluid milk	2.081	2.001	8	8
01-7 Eggs	.510	.576	4	4
01-8 Hay, hayseeds, and oilseeds	.694	.780	7	13
01-9 Other farm products	.835	.781	9	17
02 Processed foods and feeds	16.298	16.533	193	664
02-1 Cereal and bakery products	2.017	2.038	22	79
02-2 Meats, poultry, and fish	4.153	4.404	40	99
02-3 Dairy products	2.300	2.275	15	42
02-4 Processed fruits and vegetables	.866	.856	35	172
02-5 Sugar and confectionery	1.268	1.192	11	23
02-6 Beverages and beverage materials	2.118	2.047	18	104
02-7 Fats and oils [1]	.627	.603	17	24
02-8 Miscellaneous processed foods	1.185	1.183	20	67
02-9 Manufactured animal feeds	1.765	1.935	15	54
03 Textile products and apparel	6.875	7.149	183	519
03-1 Cotton products	1.086	1.152	38	93
03-2 Wool products	.346	.403	17	39
03-3 Manmade fiber textile products	1.320	1.488	45	108
03-4 Silk products [1]	------	.021	---	----
03-5 Apparel	3.631	3.562	67	235
03-6 Textile housefurnishings	.359	.384	11	32
03-7 Miscellaneous textile products	.132	.139	5	12
04 Hides, skins, leather, and related products	1.239	1.264	49	100
04-1 Hides and skins	.077	.097	12	12
04-2 Leather	.179	.196	11	12
04-3 Footwear	.694	.667	17	55
04-4 Other leather and related products	.289	.304	9	21
05 Fuels and related products, and power	7.322	7.130	67	275
05-1 Coal	.700	.439	7	39
05-2 Coke	.092	.070	6	6
05-3 Gas fuels	.677	.691	2	2
05-4 Electric power	1.767	1.808	18	173
05-6 Crude petroleum and related products [1]	.628	.614	6	22
05-7 Petroleum products, refined	3.459	3.508	28	33
06 Chemicals and allied products	5.937	6.378	335	550
06-1 Industrial chemicals	1.814	1.968	97	101
06-2 Paint and paint materials [1]	.698	.706	30	71
06-3 Drugs and pharmaceuticals	.807	.888	107	167
06-4 Fats and oils, inedible	.189	.163	7	7
06-5 Agricultural chemicals and chemical products	.545	.675	43	43
06-6 Plastic resins and materials	.366	.456	10	38
06-7 Other chemicals and allied products	1.517	1.522	41	123
07 Rubber and plastic products	2.346	2.339	88	335
07-1 Rubber and rubber products	1.475	2.339	45	163
07-2 Plastic products	.872	------	43	172
08 Lumber and wood products	2.483	2.418	77	367
08-1 Lumber	1.259	1.215	50	224
08-2 Millwork	.686	.658	15	68
08-3 Plywood	.399	.416	7	41
08-4 Other wood products	.140	.129	5	34
09 Pulp, paper, and allied products	4.796	4.877	74	266
09-1 Pulp, paper, and products, excluding building paper and board	4.655	4.719	66	222
09-2 Building paper and board	.141	.158	8	44
10 Metals and metal products	13.456	12.799	375	1,295
10-1 Iron and steel	4.797	4.547	108	404
10-2 Nonferrous metals	3.376	3.205	92	275
10-3 Metal containers	.488	.462	8	28
10-4 Hardware	.575	.548	44	144
10-5 Plumbing fixtures and brass fittings	.181	.177	13	65
10-6 Heating equipment	.256	.254	21	90
10-7 Fabricated structural metal products	1.771	1.716	41	133
10-8 Miscellaneous metal products	2.012	1.890	48	156
11 Machinery and equipment	12.508	12.110	627	2,098
11-1 Agricultural machinery and equipment	.705	.665	55	202
11-2 Construction machinery and equipment	.885	.807	49	169
11-3 Metalworking machinery and equipment	1.545	1.469	105	319
11-4 General purpose machinery and equipment	1.770	1.665	78	287
11-6 Special industry machinery and equipment	1.641	1.506	76	226
11-7 Electrical machinery and equipment	4.348	4.462	182	633
11-9 Miscellaneous machinery	1.614	1.536	82	262
12 Furniture and household durables	3.529	3.584	93	498
12-1 Household furniture	.925	.904	21	151
12-2 Commercial furniture	.449	.416	7	34

See footnotes at end of table.

WHOLESALE PRICE INDEX—CONTINUED

RELATIVE IMPORTANCE, NUMBER OF ITEMS AND PRICE QUOTATIONS FOR MAJOR GROUPS AND SUBGROUPS

Grouping	Relative importance in total 1963 weights		Number of items and price quotations, January 1971	
	December 1970	December 1966	Items	Price Quotations
12-3 Floor coverings	.336	.385	9	54
12-4 Household appliances	.862	.391	28	134
12-5 Home electronic equipment	.383	.459	10	52
12-6 Other household durable goods	.574	.529	18	73
13 Nonmetallic mineral products	3.175	3.040	45	405
13-1 Glass [1]	.388	.364	4	14
13-2 Concrete ingredients	.630	.612	4	169
13-3 Concrete products	.922	.882	4	68
13-4 Structural clay prods., excluding refractories	.170	.168	6	49
13-5 Refractories	.159	.139	5	5
13-6 Asphalt roofing	.120	.127	5	18
13-7 Gypsum products	.090	.106	3	9
13-8 Glass containers	.305	.273	7	26
13-9 Other nonmetallic minerals	.392	.369	7	47
14 Transportation equipment	7.441	7.244	77	152
14-1 Motor vehicles and equipment	6.642	6.932	62	132
14-2 Aircraft [1]	.490	------	10	10
14-4 Railroad equipment	.310	.312	5	10
15 Miscellaneous products	2.556	2.498	119	350
15-1 Toys, sporting goods, small arms, etc.	.515	.513	30	103
15-2 Tobacco products	.863	.802	9	48
15-3 Notions	.101	.102	5	10
15-4 Photographic equipment and supplies	.371	.386	40	69
15-9 Other miscellaneous products	.705	.695	35	120

[1] Subgroup index not published.

NOTE: Relative importance represents the basic value weight of an item or items multiplied by the relative of price change between the weight date and a later date, and the result is expressed as a percentage of the total for all commodities. The differences between the relative importances as of December 1966, the date of last major weight change, and that of December 1970 are the result of price changes only.

Prices for individual commodities reported by the individual companies are averaged (usually by means of an unweighted average). Month-to-month price change should be computed from matched-company data. In order that a change in the company-reporter sample itself not affect the measure of percent change, the change is calculated for any 2 months from identical-company data. Thus, a new report affects the index no earlier than the second month.

Classification

The classification system of the WPI follows commodity lines. Products are grouped by similarity of end-use or material composition, rather than by industry of origin. The WPI classification does not match the Standard Industrial Classification (SIC), the Standard Commodity Classification, the United Nations Standard International Trade Classification (SITC), or any other standard classification. Historical continuity and the needs of index users have been important in developing the classification. No single classification plan can meet all of the requirements for wholesale price statistics, but the plan adopted should be flexible enough to facilitate regrouping of price series to make special grouping indexes. In January 1971, the index was made up of 15 major groups, 87 subgroups, 291 product classes, 554 subproduct classes, and 2,503 items.[7]

To meet the needs of index users, a number of special group indexes are calculated and published each month. Among these are indexes by stage of processing,[8] indexes by durability of product, and indexes of construction materials, in addition to about 22 other special group indexes.

Except for the stage of processing indexes, these special groupings consist of rearrangements of the WPI data into different combinations of price series, so that the appropriate prices and weights are those of the WPI. The stage of processing indexes, however, regroup each item priced in the WPI according to the amount of processing, manufacturing, or assembling it undergoes before entering the market. A commodity may appear in several different categories in this scheme. Thus, 29 percent of the fresh vegetables (by value-weight) was assigned to crude foodstuffs and feedstuffs for further processing and 71 percent to consumer foods (as "finished" goods). The value weights are the same as those of the WPI and the allocations among the stages of processing are from an inter-industry transaction study made for the year 1958 by the Office of Business Economics.

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[7] See table for the major groups and subgroups included in the WPI.

[8] The broad stages of processing are: Crude materials for further processing; Intermediate materials, supplies, and components; and Finished goods. Each of these is subdivided further.

Data Sources and Collection Methods

Prices

Price data are collected by mail questionnaire, and reporting is voluntary and confidential. Most prices are collected each month. For a few commodities, for which price changes are infrequent, the shuttle schedule is mailed quarterly, but monthly prices are requested. Generally, the price data used in the index are obtained directly from the producing company, but some trade publications are used when the publication generally is accepted as reliable by the Bureau and the industry. For fish and most agricultural products, the prices used are those collected and published by other Government agencies.

Price reporting is initiated, wherever possible, by a personal visit by a Bureau representative to the prospective respondent. Pricing of additional products from established reporters often is started by mail. In any event, a detailed report describing all of the price-making characteristics of the commodity is prepared for each new price series. This commodity price information sheet (BLS 1810) is shown on pages 107 and 108. The form becomes a part of the permanent record for the series. After the initial collection of prices, monthly information is collected by mail on a shuttle schedule. (BLS 473, shown on pages 109 and 110.)

Weights

The price data are combined using weights based on value of shipments. The major sources of the value data are:

Bureau of Census	Census of Manufactures Census of Mineral Industries
Bureau of Mines	Various publications, e.g., Minerals Yearbook
Department of Agriculture	Various publications, e.g., Agricultural Statistics
Bureau of Fisheries	Various publications, e.g., Fisheries of the United States

In addition, many other sources of data, such as trade associations, are used. Import data are obtained from a report of the U.S. Department of Commerce, *United States Imports for Consumption.*

Sampling

The monthy index is based on a judgment sample of commodities, a sample of specifications (descriptions), and a sample of reporters. The sample of commodities is chosen after a review of the data of the industrial censuses and other statistics of value of transactions. Generally, the commodities chosen are those of the largest shipment values. Starting with January 1967, expansion of Industry Sector Price Index sample coverage has been a major influence in selecting new products for the WPI. New items are not added until they have become established in the market.[9] They are added, normally, in December of any year, and have their first effect on the index in January.

Samples of specifications and of reporters are selected after consultation with trade associations or other industry representatives and with staff of other government agencies. Individual commodity specifications are selected also on the basis of net dollar sales. That is, the "volume seller" of the industry (not of the company) is preferred. The specification describes not only the popular physical characteristics but also the most common quality, grade, level of distribution, and market. However, terms of sales (discounts, etc.) are based on the company's own most common practice. For some commodities, prices are quoted by producers and sellers in terms of a single specification taken as standard; all other prices are quoted as differentials from the standard. The latter is true for some farm products such as wheat and cotton. When no standard commodity basis exists, the specification to be priced is selected with the help of industry experts.

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[9] If new items are added before they become fully established, the sharp price decline experienced by most products, as they move from development to mass production, imparts a downward bias to the index. Also, many new products turn out to be of only transitory significance.

The number of reporters is determined, to some extent, by the variation of price movements among them and the degree of price leadership. Whenever possible, a minimum of three companies is obtained, so that data for specified commodities can be published without disclosure of information supplied by individual companies. For commodities with more than one major production area and a definite regional pattern, a larger sample is selected. Among these commodities are waste materials and building materials such as brick, cement, and stone.

A comparatively small list of properly selected commodities would produce a reliable index, if only an All Commodities index were desired. However, historically interest has been great in indexes for groups of commodities and for individual commodities. To meet these needs, the Bureau has increased the sample in order to provide more detailed indexes as well as many special-purpose indexes.

Estimating Procedures

Formula and Calculation

In concept, the Wholesale Price Index is calculated according to a modified Laspeyres formula:

1. $I_1 = [\Sigma\ Q_aP_1 / \Sigma\ Q_aP_o] \times 100$, where P_o is the price of a commodity in the comparison period and P_1 is its price currently. Q_a represents the quantity shipped during the weight-base period.

An alternative formulation more closely approximates the actual computation procedure:

2. $I_1 = [\Sigma\ (Q_aP_o)\ (P_1/P_o)\ /\ \Sigma\ Q_aP_o] \times 100.$

In this form, the index is a weighted average of price relatives for each item (P_1/P_o). The expression (Q_aP_o) represents the weights in value form and the "P" and "Q" elements (both of which originally relate to period "a" but are adjusted for price change to period "o") are not derived separately. Each value weight includes not only the value of items priced but also the values of unpriced items whose price movements are assumed to behave similarly. When new weights are introduced, the index with new weights is linked to the index constructed with the earlier weights. The weight adjustment itself, therefore, affects only the later calculations of average price change. When specifications or samples change, the item relatives must be computed by linking (multiplying) the relatives for the separate periods for which the data are precisely comparable. (For a somewhat more detailed treatment, see chapter 10, Consumer Prices.)

Base Period

The Wholesale Price Index has been computed on the government-wide standard reference base 1967=100 since January 1971.[10] It had been based 1957–59=100 from January 1962 through December 1970. Earlier bases were 1947–49, 1926, and 1913. New items (or new index groupings consisting primarily of new items) introduced into the index after 1967 cannot be calculated on the 1967 base. Such indexes are published with separate bases related to the date of introduction.

Weights

The WPI weights represent the total net selling value of commodities produced, processed, or imported in this country, including Alaska and Hawaii, and flowing into primary markets. The values are f.o.b. production point and are exclusive of excise taxes. The value of interplant transfers, military products, and goods sold at retail directly from producing establishments also are excluded. Thus the definition of the weights conforms to the universe definition.

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[10] Conversion of indexes from the 1967=100 base to the 1957–59 base may be accomplished by multiplying the 1967=100 based index by that item's 1967 annual (12-month) average (1957-59=100) and dividing the result by 100. Averages for 1967, calculated from 12 months' data, and appearing in the December 1968 issue of "Wholesale Prices and Price Indexes" may be used for base conversion.

Each commodity price series is considered representative of a class of prices and is assigned its own weight (the shipment value of the commodity) plus the weights of other related commodities not directly priced but whose prices are known or assumed to move similarly.[11] The assignment of price movements for priced commodities to those for which quotations are not obtained is referred to as imputation. For some commodities—such as ships and some kinds of custom-made machinery—it is not possible to obtain direct measures of price movement. The weights for such items are assigned to other commodities or groups of commodities for which prices are available. Usually, this assignment is made to priced commodities that have a similar manufacturing process, on the assumption of similar price movements. Price movements for attachments and parts for certain machinery often are imputed to the machine itself.

The Bureau's policy is to revise the WPI weights periodically when data from the industrial censuses become available.[12] The weights beginning in 1967 are based on the 1963 industrial censuses. The next revision which normally would follow the 1967 industrial censuses has been postponed because of lack of resources. Indexes for 1947 through 1954 are based primarily on the 1947 censuses. In the January 1955 index, adjustments were made to align the major group weight totals with 1952–53 average shipment values as reported in the Annual Surveys of Manufactures. Weights based on the 1954 census shipment values were introduced in January 1958. From 1961 through 1966, weights were based on 1958 census values. In January 1967, new weights from the 1963 industrial censuses were incorporated with the comprehensive reclassification mentioned previously. Subsequent minor redistributions of the weights have been made each January to account for additions and deletions of commodities.

The Bureau publishes the relative importance of each item in the WPI rather than the actual values used as weights. The relative importance of an item represents its basic value weight used in the index, including imputations, multiplied by the relative of price change from the weight date to a later date; the result is expressed as a percent of the total for all commodities or for some index grouping.[13]

Imputing Missing Prices

Whenever price data are not available for a particular month, it is necessary to estimate the missing price for use in the calculation of the index. For commodities in the farm products and processed foods groups, out of the market seasonally, the price in off-season is imputed from the combined movement of the related commodities for which prices are available for the two periods being compared. For other commodities, delinquent prices are held unchanged from the preceding month.

Prices for some custom-made items are reported to BLS as estimates. For example, prices for fabricated structural steel for buildings and bridges are obtained from producers who reprice, each month, steel of the same specifications as used in structures on which they had been engaged at the time pricing for the WPI was initiated. Elevators, normally sold including installation, are reported f.o.b. plant—i.e., excluding transportation and installation cost—for use in the WPI.

Analysis and Presentation

The monthly WPI is published first in a press release, usually issued in the first week of the month following the reference month. Indexes are shown for all groups and subgroups as well as for All Commodities, Farm Products and Processed Foods and Feeds combined, and Industrial Commodities. Analytic tables also are included which show monthly percent changes for the preceding 12 months for major groupings, and selected seasonally adjusted and unadjusted changes for some stage of processing classifications. A brief description and analysis of the causes of price movements are included. The monthly detailed report, issued some time after the press release, carries all data for which wholesale price indexes are published, including item indexes and all special group indexes. Prices for many individual commodities also are included. Each quarter this report includes a more comprehensive analysis than that given in the press release. Annual summaries appear in the monthly report as they become available. In addition, numerous historical tabulations at various levels of detail are available on request.

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[11] Before the 1952 revision (calculated back to 1947), priced items in the index were weighted only by their own market values.

[12] In general, the censuses are collected at 5-year intervals.

[13] The use of relative importance data to construct indexes for groups of products is discussed in the January 1970 issue of "Wholesale Prices and Price Indexes." Relative importances as of December for all WPI items are published in each January issue.

The monthly indexes are published as final. Beginning with data for January 1967, only major corrections are made and published immediately at the time the error is discovered. Each year, after calculation of the December index, all corrections reported during the year are made, and the indexes for all 12 months and the annual average are republished as revised.

Selected seasonally adjusted indexes or percent changes are published in the press release and monthly detailed report. About 50 indexes which historically show significant and consistent seasonal movement are presented each month seasonally adjusted and unadjusted. The applicable season adjustment factors are available on request from the Bureau. These factors are recalculated annually to include more recent data, and the most recent set of factors may differ somewhat from those previously in use.

Uses and Limitations

The WPI is used by government and private research agencies for many purposes, including market analysis, escalation of long-term purchase and sales contracts, and formulation of monetary policies. It is used, as well, as an indicator of economic trends.

A 1961 survey of users of the WPI revealed that more than one-half use the All Commodities index as a general economic indicator. About 40 percent use that index or its components to compare with their selling or buying prices. The survey revealed that over 10 billion dollars (in terms of unexpired value) in long-term contracts for purchase of material or lease of industrial property are escalated according to changes in the total index or its components. Government agencies and private research groups also use the component series in deflating value data in preparation of the gross national product estimates and in studies of economic growth.

The index also is used by buyers and sellers of commodities—purchasing agents and sales managers. In most of these cases, it is not the All Commodities index, but rather the group indexes and the individual price series that are employed. Buyers of commodities are able to check both the amounts which they pay for goods and the general movement of their purchase prices against the index. The use of the index for checking absolute price levels is limited substantially, however. The Bureau's main goal has been to measure the direction and amount of change, and only incidentally to measure actual selling prices.

The index, as a measure of general and specific price trends, also is used widely in budget making and review, both in government and in industry; in planning the cost of plant expansion programs; in appraising inventories; in establishing replacement costs; etc. Components of the index also are used in LIFO (Last-In, First-Out) inventory accounting by some organizations.

Although the WPI often is used to measure change in purchasing power of the dollar, it should not be used to measure changes in general purchasing power, prices at retail, securities prices, etc. Comparisons between the level of the WPI, the Consumer Price Index, and the indexes of prices of farm products show relative change from a base period, but comparisons of the index levels should not be used as a measure of the actual margins between farm prices and manufacturing or between manufacturing and retail. Its commodity classification structure should be borne in mind when using it to measure price changes for industries, many of which make divers products not classified as their "primary" products.[14]

Again, as in other measures, the WPI has some limitations even in the field for which it is conceptually designed. Segments of the index are used as deflators of gross national product data, but gaps in WPI coverage leave considerable areas for which deflators have not been provided.

The WPI is based on a purposive, judgment sample. The All Commodities Index can be assumed to be more reliable than a component group index, in general. Also, it can be assumed that the reliability of the index has increased over time as the sample has expanded.[15] As the economy has produced an increasing proportion of fabricated finished goods (whose price changes are relatively infrequent), over the years, movement of the WPI has become somewhat smoother. Currently, new products are added each year. In earlier decades, there were also major additions of large numbers of new items at one time, in commodity areas previously underrepresented. These sudden expansions could have made it appear that prices had stabilized suddenly.

To the extent that quality improves (or deteriorates) over the years, the index errs when no adjustment is made. However, the Bureau makes suitable adjustments whenever possible. Assuming quality improvement, the index would have an upward bias if direct comparison were made between unimproved and improved articles. If, on the other hand, such changes were consistently made by linking, a downward bias would result. Since the Bureau has not adopted either method exclusively, and in many instances tries to evaluate the changes brought to its attention, the bias that may exist is considered to be small. However, no measure of its magnitude is available.

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[14] See Chapter 12 on Industry-Sector Indexes.

[15] The sample of priced items doubled in 1952 to about 1,850 items and has increased to about 2,500 since then.

BLS 1810

THIS FORM WILL BE HELD IN CONFIDENCE
U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
Washington, D.C. 20212

Budget Bureau No. 44-R0602
Expiration date: 12/31/73

Commodity ________

Code No. ________

COMMODITY PRICE INFORMATION SHEET

Firm name ________
Plant or division ________ Mfr. ☐ Other ________ *(Specify)*
Address ________ *(Street)* ________ *(City and State)* ________ *(Zip code)*
Information authorized by ________ Title ________
Information furnished by ________ Title ________
Mail schedule to ________ *(Reporter)* Title ________
Address ________ *(Street)* ________ *(City and State)* ________ *(Zip code)*

1. COMMODITY DESCRIPTION (include style no., model no., lot no., grade, brand, etc)

____
____
____
____
____
____

2. PRICE HISTORY FOR COMMODITY DESCRIBED ABOVE

Date	Price	Remarks	Date	Price	Remarks

3. CHECK OR FILL-IN PERTINENT INFORMATION ABOUT PRICES REPORTED ABOVE

A. Class of seller ________ *(mfr., importer, etc.)* to Class of customer ________ *(wholesaler, user, etc.)*
B. Prices are: Actual transaction prices[1] ☐; List prices subject to discounts ☐;
List prices less discounts ☐; Other ☐ (specify) ________
C. Unit quoted ________ D. Size of order ________
E. Shipping terms (f. o. b.; frt. allowed; ect.) ________
F. Type of package used; Crate ☐; Carton ☐; Bag. ☐; Other ________
G. Is refund allowed for returnable container? Yes ☐ No ☐ If "Yes", explain ________

____

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[1] Actual selling prices to class of customer, for size of order, shipping terms, and discounts reported.

4. ENTER DISCOUNTS AND ALLOWANCES APPLICABLE TO REPORTED PRICES WHEN COMMODITY DESCRIBED IS SOLD TO THE CLASS OF CUSTOMER SPECIFIED IN 3A.

A. Trade discount ______________ %

B. Quantity discount (based on size of order specified in 3D) ____________ %

FOR THE FOLLOWING, INDICATE DISCOUNT TERMS AND ESTIMATE THE PERCENT OF SALES AFFECTED

	Terms	Estimated % of sales
C. Cash discount	______________	________ %
D. Seasonal discounts	______________	________ %
E. Cumulative volume discount	______________	________ %
F. Rebates (monthly)	______________	________ %

G. Other discounts, allowances, free deals, etc. (explain fully) ______________

CIRCLE ALL DISCOUNTS OR ALLOWANCES ABOVE WHICH HAVE BEEN DEDUCTED IN ARRIVING AT PRICES REPORTED

5. LIST DUTIES OR EXCISE TAXES APPLICABLE TO REPORTED PRICES.

A. These are included in prices quoted ☐ Not included ☐

B. If tax is included, give example of how to calculate price excluding tax.

6. ENTER APPROXIMATE PERCENTAGE OF SALES TO EACH CLASS OF CUSTOMER.

	Other mfr. (O.E.M. or assembler)	Distributor	Jobber	Wholesaler	Retailer	User	Other (specify)	Total
Sales (approx.%)								100%

Remarks: ______________

BLS Representative ______________ Date ______________

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

INFORMATION FOR THE WHOLESALE PRICE INDEX

ALL REPORTS WILL BE HELD IN CONFIDENCE

Dear Sir:

The price data which you provide is used in computing the Wholesale Price Index which is the officially accepted indicator of primary market price movements. The index is widely used by industry and government.

These voluntary reports, submitted by you and other businessmen, are the major source of information used in preparing this index. The information you provide is strictly confidential and open to inspection only to sworn employees of the Bureau of Labor Statistics.

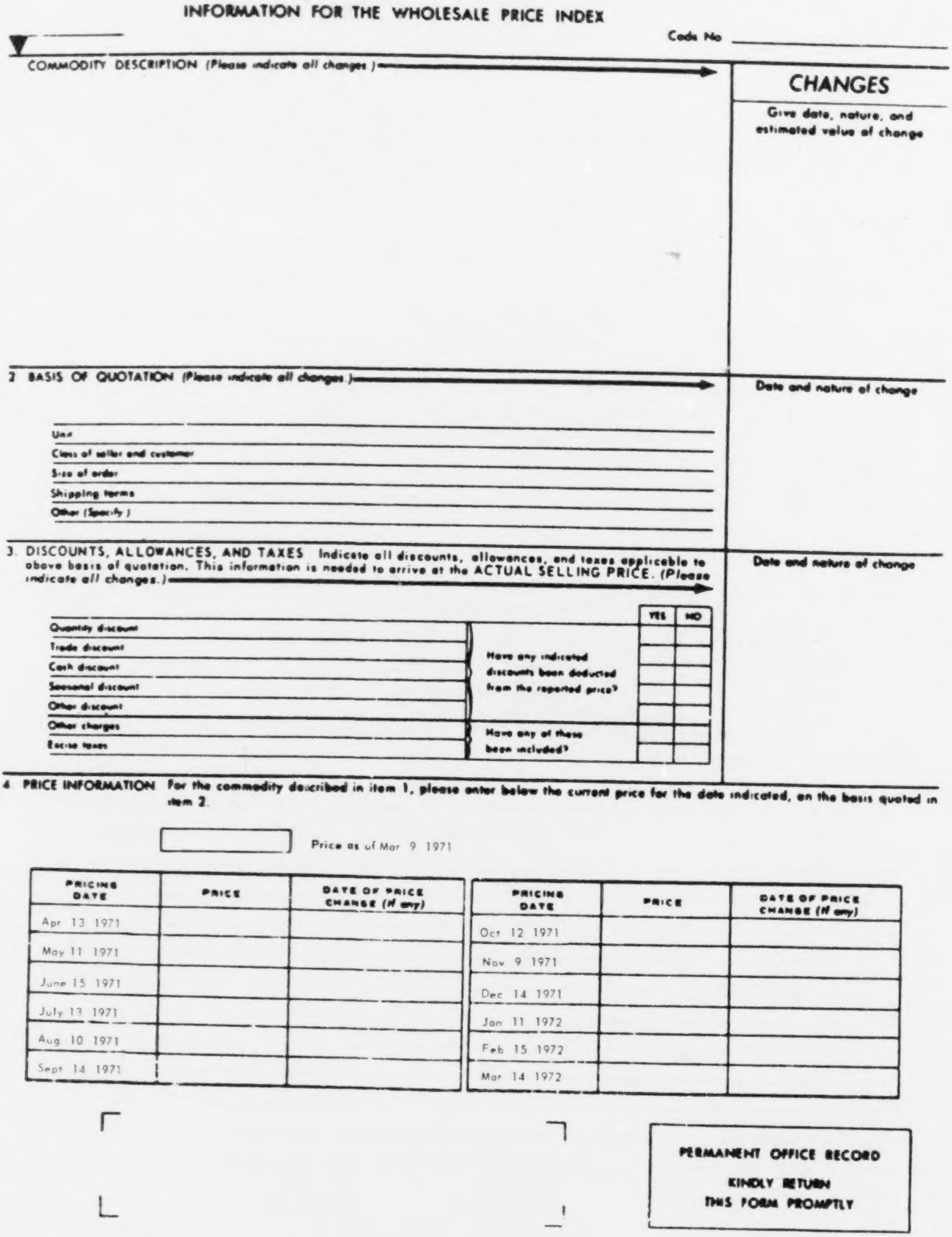
Please use the enclosed envelope, which requires no postage, for returning this schedule. Your continued cooperation is greatly appreciated.

COMMISSIONER OF LABOR STATISTICS

IMPORTANT INSTRUCTIONS

In the boxes provided on the other side, please be sure to indicate all changes in
COMMODITY DESCRIPTION, BASIS OF QUOTATION, DISCOUNTS, ALLOWANCES, AND TAXES
that may have occurred since your last report.
Your cooperation in keeping all information current
is a great aid in computing a reliable, accurate Wholesale Price Index.

(Remarks)



INFORMATION FOR THE WHOLESALE PRICE INDEX

Code No ____________

COMMODITY DESCRIPTION *(Please indicate all changes.)* →

CHANGES

Give date, nature, and estimated value of change

2 BASIS OF QUOTATION *(Please indicate all changes.)* →

Date and nature of change

Unit ____________

Class of seller and customer ____________

Size of order ____________

Shipping terms ____________

Other (Specify.) ____________

3. DISCOUNTS, ALLOWANCES, AND TAXES Indicate all discounts, allowances, and taxes applicable to above basis of quotation. This information is needed to arrive at the ACTUAL SELLING PRICE. *(Please indicate all changes.)* →

Date and nature of change

		YES	NO
Quantity discount	Have any indicated discounts been deducted from the reported price?	☐	☐
Trade discount		☐	☐
Cash discount		☐	☐
Seasonal discount		☐	☐
Other discount		☐	☐
Other charges	Have any of these been included?	☐	☐
Excise taxes		☐	☐

4 PRICE INFORMATION For the commodity described in item 1, please enter below the current price for the date indicated, on the basis quoted in item 2.

☐ Price as of Mar 9 1971

PRICING DATE	PRICE	DATE OF PRICE CHANGE *(If any)*
Apr 13 1971		
May 11 1971		
June 15 1971		
July 13 1971		
Aug 10 1971		
Sept 14 1971		
Oct 12 1971		
Nov 9 1971		
Dec 14 1971		
Jan 11 1972		
Feb 15 1972		
Mar 14 1972		

PERMANENT OFFICE RECORD

KINDLY RETURN
THIS FORM PROMPTLY

Technical References

Number

1. Cunningham, Francis S., "The Use of Price Indexes in Escalator Contracts," ***Monthly Labor Review***, August 1963, pp. 948–952 Reprint No. 2424.

   A statement of the use of the Wholesale and Consumer Price Indexes in escalating purchase and sales contracts and wages, with some specific suggestions and pitfalls noted.

2. Evans, W. Duane and Hoffenberg, Marvin, "Input-Output Relations and Appraisal," in ***Studies in Income and Wealth***, New York, National Bureau of Economic Research, (1955) Vol. 18.

   A statement of the conceptual framework, data, pricing problems and significance in economic analysis of the U.S. Government's interindustry statistical study of 1947.

3. Evans, W. Duane and Hoffenberg, Marvin, "The Inter-Industry Relations Study for 1947," ***The Review of Economics and Statistics***, May 1952, pp. 97–142.

   A description of scope, uses, and method of the U.S. Government's interindustry statistical study of 1947. Includes discussions of computational problems, areas of use, data requirements, etc.

4. National Bureau of Economic Research. ***The Price Statistics of the Federal Government: Review, Appraisal, and Recommendations***, Washington, D.C., NBER General Series, Number 73 (1961).

   An appraisal of price statistics of the Federal Government by the Price Statistics Review Committee of NBER, covering uses, concepts, collection, and publication, sampling, and other aspects of the Consumer Price Index, Wholesale Price Index, Index of Prices Paid by Farmers, and other price measures.

5. Searle, Allan D., "Weight Revisions in the Wholesale Price Index, 1890–1960," ***Monthly Labor Review***, February 1962, pp. 175–182.

   History of weight changes and weighting concepts, from inception of the Wholesale Price Index.

6. U.S. Congress, Joint Economic Committee. ***Government Price Statistics: Hearings: Subcommittee on Economic Statistics***, 87th Congress, 1st sess., Part 1, Jan. 24, 1961, 526 pp.; Part 2, May 1–5, 1961, 265 pp.

   Part I presents the report, Price Statistics of the Federal Government, prepared by the NBER (q.v.); Part II contains statementer of Labor Statistics.

   the response of Ewan Clague, Commissions of private and government economists including

7. U.S. Department of Labor, ***Wholesale Prices, 1890 to 1899*** (Bulletin 27, 1900).

   Describes an inquiry into the course of wholesale prices for the purpose of continuing the study contained in the Report on Wholesale Prices, Wages, and Transportation made by the Senate Committee on Finance, March 3, 1893 (pp. 237–313).

8. U.S. Department of Labor, ***Course of Wholesale Prices, 1890 to 1901*** (Bulletin 39, March 1902).

   Describes United States Senate Finance Committee index (pp. 205–211), and Department of Labor index (pp. 212–243).

9. U.S. Department of Labor, Bureau of Labor Statistics, ***Wholesale Prices and Price Indexes, 1954–56*** (Bulletin 1214, 1957).

   Method of Calculating Special Group Indexes, (pp. 12–13), Calculating Relative Importance Data (p. 14), Description of Indexes by Stage of Processing (Economic Sector Indexes) (pp. 15–22); A Possible Effect on Weight Revisions (p. 7).

10. U.S. Department of Labor, ***Seasonal Adjustment Factors; Wholesale Price Index:*** Selected Series 1948–1961 (BLS Bulletin 1379, 1963).

    Seasonal adjustment factors for 183 commodities and commodity groups, and description of BLS seasonal adjustment method.

11. U.S. Department of Labor, ***Wholesale Prices and Price Indexes, 1957***, BLS Bulletin 1235 (1958).

    Indexes by Durability of Product (Economic Sectors by Durability of Product), pp. 11–14.

12. U.S. Department of Labor, Bureau of Labor Statistics, ***Wholesale Prices and Price Indexes, 1958***, BLS Bulletin 1257 (1959).

    Describes Supplementary Inquiry on Wholesale Price Reports (discount study), pp. 10–12, and January 1958 Revision of the Weighting Structure, pp. 14–16.

13. U.S. Department of Labor, ***Wholesale Prices and Price Indexes, 1961***, (BLS Bulletin 1382, 1964).

Technical References—Continued

Number

January 1961 Revision of the Weighting Structure, pp. 14–16.

14. U.S. Department of Labor, Bureau of Labor Statistics, *Wholesale Prices and Price Indexes, January 1967 (final) and February 1967 (final).*

    Describes introduction of new 1963 weight values and major reclassification effected in January 1967.

15. U.S. Department of Labor, *Wholesale Prices and Price Indexes, January 1970.*

    Describes derivation and use of relative importances (weights) and lists all WPI weights for December 1969.

16. U.S. Department of Labor, *Wholesale Prices and Price Indexes, January 1971.*

    Introduces the new standard reference base, 1967=100, and describes conversion from the former base.

17. U.S. Senate, *Wholesale Prices, Wages, and Transportation,* Senate Report No. 1394, Part I, "The Aldrich Report" (1893).

    Contains a summary of the complete Senate report on wholesale prices, on wages, and on transportation made in response to a Senate resolution of March 3, 1891.

18. Searle, Allan D., "Toward Comprehensive Measurement of Prices," *Monthly Labor Review,* March 1971, pp. 9–22.

    Describes how a general price index could be constructed, what it should accomplish, and virtues and limitations of various approaches.

19. Clorety, Joseph A., Jr., "Measuring Changes in Industrial Prices," *Monthly Labor Review,* November 1970, pp. 30–36.

    Relates Stigler-Kindahl study (NBER, 1970) to BLS program.

—THOMAS R. TIBBETTS

Chapter 12. Industry-Sector Indexes

Background

During recent years a growing need for comprehensive measures of industrial prices, in addition to the market oriented prices of the Wholesale Price Index, has become increasingly apparent. As a result, the Bureau initiated a program of industry-sector price indexes based upon data collected for the WPI.

An industry or sector price index is essentially a composite index made up of price series that match the economic activity of a defined industry or economic sector. The Wholesale Price Index, on the other hand, is compiled according to commodity rather than industry groupings. The number of sectors or industries for which these series are compiled depends largely upon resources available for additional pricing.

A set of industry-sector price indexes covering the years 1947 through 1953 was prepared in the early 1950's as part of the Bureau's project on interindustry economics. These indexes, generally a regrouping of the Wholesale Price Indexes into the interindustry (input-output) classification structure, were designed for revaluing bills of goods and industry outputs. In 1959, another set of such indexes was compiled for the Bureau of the Census in connection with that agency's construction of the 1958 production index benchmark.[1] This second group of price indexes was used in deflating values of shipments in those census product classes where physical production data were lacking or unsatisfactory. Again, these were essentially indexes of commodity prices, classified as primary to a given industry.[2]

The need for the Bureau to develop Industry-Sector Price Indexes became increasingly apparent in 1960 and 1961, when the Price Statistics Review Committee of the National Bureau of Economic Research recommended to the Bureau of the Budget that the basic objectives of an industrial price program should be comprehensiveness, maximum detail in reporting, and groupings most useful in economic analysis.[3] The committee stated ". . . It seems desirable that the subclassification should aim at fitting into the Standard Industrial Classification."

In 1962, the Bureau of Labor Statistics intiated the development of industry and sector price indexes. Because of its scope, the program was viewed as a long-run program to be accomplished in several stages. The first stage was devoted to the study of conceptual and data problems with only a gradual expansion of commodity pricing.

The first indexes to be developed were output price indexes utilizing gross shipments weights. Priority was given to indexes for the manufacturing and mining divisions of the Standard Industrial Classification. The next stage will be the development of output price indexes for the trade and transportation and other nonmanufacturing sectors. Input price indexes, i.e., indexes representing the price of industrial purchases, will come later. Eventually the work will expand sufficiently to permit the development of a general price index of the entire economy.

Description of the Survey

Concepts

An industry or sector price index is a composite index derived from several series of prices that closely match the economic activity of a specified industry or industry sector. These indexes may be either output or input price indexes based upon either the products and services sold or the products and services purchased by an industry. An output price index for a given industry represents price indexes for a sample of the products produced by that industry, averaged together according to the relative importance of production of each sample product to the industry. An input price index for an industry consists of an aggregation of price indexes for a sample of the commodities and services purchased by the industry, averaged together according to the relative magnitude of the purchases.

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[1] None of these earlier indexes was published, but they were made available to other government research agencies. See Chapter 31, section on Economic Growth Studies, for background on interindustry studies.

[2] The classification of establishments into industries, in this program, follows the guidelines established by the Office of Management and Budget in its Standard Industrial Classification (SIC) system, as revised in 1957. Under this classification system, related products or services are grouped together and given an industry code number (consisting of 4 digits). Every establishment is assigned to the industry in which its most important products or services, in terms of values, are classified. Many industries contain establishments which produce significant quantities of goods and services that are classified in other industries. These goods usually are referred to as "secondary products." See appendix B.

[3] *Government Price Statistics*, Hearings before the Subcommittee on Economic Statistics, of the Joint Economic Committee, Congress of the United States, Part I, January 24, 1961, page 64. Also see report of United Nations Economic and Social Council; *Problems and Methods in the Gathering of Representative and Comparable Wholesale Price Series*, E/CN. 3/264, 15 March 1960, Chapter II.

The Bureau's work has been directed first toward two sets of output indexes. One set is weighted by gross shipments of products "made in the industry" to be used for deflating industry shipments. The second set will be output price indexes of shipments classified on the industrial basis but weighted by shipments of the product produced anywhere in the economy. A principal use of the second set is for input-output analysis.[4]

Universe

Ultimately, the scope of the universe will be defined in terms of the Office of Management and Budget's Standard Industrial Classification (SIC) system as revised in 1967, which covers all domestic economic activity. This system groups together related products or services and assigns them industry and sector codes. Currently, however, the scope of pricing is effectively restricted to the commodities' coverage of the WPI because of the use of WPI price data.

If price indexes are to parallel industry output data, the indexes should cover the total output of each industry including the value of interplant transfers, the value of sales to all classes of customers, and the value of industrial services. They should include the value of sales for export but exclude excise taxes and costs of transporting finished goods to purchasers. This is consistent with the "total activity" coverage of statistical series on employment and production.

Input price indexes of materials consumed in production should cover total materials inputs of the industry. This would include imports for consumption, and also transportation and delivery costs.

Prices and Base Period

The prices used in the current Industry-Sector Indexes are in general those used in the Wholesale Price Index. In the Wholesale Price Index, primary market prices, f.o.b. production point, are used. For the Industry-Sector Indexes, pricing eventually should be extended to all classes of customers, including retail, for use in the output indexes. Buyers' prices, including shipping costs, should be used for input indexes and should represent the particular mix of products purchased by the buying industry.

As of January 1971, the reference base period for Federal Government indexes is 1967=100.

Classification

The Standard Industrial Classification (SIC) of the Office of Management and Budget provides the framework for the Industry-Sector Index classification scheme. Within this framework, individual products are given a 7-digit code by the Bureau of the Census.[5] The product indexes are aggregated to 5-digit product classes and 4-digit industries. Industry indexes can be aggregated to 3- and 2-digit levels as well. Four-digit industry indexes also can be aggregated to fit the sectoring plan of the latest Input-Output model.[6]

Sampling and Estimating Procedures

Sampling

Currently the Industry-Sector program largely depends on price data already available in the Wholesale Price Index. However, extension of industrial pricing is being geared to the new program. A sampling plan has been prepared which outlines industrial sectors that should have priority as new pricing is undertaken. As the result of this analysis, pricing may be cut back in some sectors to permit extension of pricing into inadequately covered sectors.

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[4] See Chapter 31, section on Economic Growth Studies, for a discussion of the nature and uses of input-output data. See also W. Duane Evans and Marvin Hoffenberg, "The Inter-Industry Relations Study for 1947," *The Review of Economics and Statistics*, May 1952, pp. 97–142; and "Input-Output Relations and Appraisal," *Studies in Income and Wealth*, vol. 18, National Bureau of Economic Research, New York, 1955.

[5] The SIC provides no product codes.

[6] The Input-Output model referred to is that compiled by the Office of Business Economics, U.S. Department of Commerce. See National Economics Division, "Input-Output Structure of the U.S. Economy: 1963," Survey of Current Business, November 1969, pp. 16–47.

Price data used in computing an industry-output price index should be representative of the output of the industry, that is, of the values of products made in plants classified in the industry, but should exclude prices of products primary to the industry but made in plants classified in other industries. Even though the products are the same, the prices received by the primary and secondary industries may be different, sometimes because these industries sell to different types of users. As a rough guide to the adequacy of sampling, the immediate objective is to represent at least 50 percent by value of the commodities included in each 5-digit Census product class.[7] This percentage will be slightly less at higher levels of aggregation. This criterion will be adjusted to levels indicated by differences in variability of price change among product classes as experience makes possible the use of more sophisticated sampling approaches.

Weights

Since January 1967, weights for the output indexes are 1963 value of shipments obtained from the Census of Manufactures, the Census of Mineral Industries, and data of the U.S. Department of Agriculture. Indexes for 1957 through 1966 are weighted by 1958 values. Values include interplant transfer values, values for goods produced and consumed in the same establishment, and the value of goods sold for export. Values of imported commodities are not included. The difference in the scope of the weights, as compared with the WPI, stems from the objective in this system to match price data with the scope of domestic industry production.

Each priced product actually represents a class of commodities and is assigned its own weight plus the weights of other products not directly priced in the index but whose prices are known or assumed to move similarly. Values for unpriced products which cannot be assigned to a specific priced commodity are imputed to the average movement of the product classes in which they fall.[7]

For use in deflating industry shipments, the 4-digit (SIC) Industry Indexes are derived from 5-digit product class indexes weighted together by their shipments value for the particular industry, i.e., the "made-in-the-industry" value.

Formula and Calculation

A modification of the Laspeyres fixed-weight formula is used. The underlying formula is: $I_i=\Sigma(P_i/P_o \cdot Q_o)/\Sigma P_oQ_o$ where P_i/P_o is an individual product price index. P_oQ_o, the value weight (base year price times weight year quantity), currently is the 1963 value of shipments adjusted for price change from the year 1963 to 1967. In succeeding years, new weights will be introduced whenever weights are revised for the comprehensive Wholesale Price Index.[8]

In actual practice the calculation may be somewhat more involved than indicated by the simple formula above. For example, indexes used for deflating industry shipments values should employ product weights based upon values of commodities made within the same industry. Since the Census data for such values are available only at the 5-digit (product-class) level, it is necesary first to construct product-class indexes based upon total output (wherever made) weights. Then, using 5-digit made-in-the-industry weights, the product-class indexes are combined to the 4-digit industry level.

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[7] This procedure is the same as that employed in the WPI. However, as the product classes are defined differently, an unpriced commodity may have a different price movement imputed to it in the Industry Index program than it has in the WPI.

[8] Much of the value used in weighting the WPI is derived from the periodic Census of Manufactures and Mineral Industries which are currently collected on 5-year cycles. See Chapter 11, Wholesale Prices.

Analysis and Presentation

The published indexes for selected 5-digit product classes and 4-digit industries are annual averages for the period 1957 through 1964, and cover 44 manufacturing and eight mineral industries. Monthly indexes are available beginning January 1965 for the same limited number of industries and products. Additional indexes are published as they become available. By January 1971, indexes were published for 102 four-digit industries and about 350 five-digit product classes.

Uses and Limitations

Price statistics organized along industrial lines have particular relevance to studies of economic growth, productivity, and other types of industrial and economic analysis where the emphasis is on industrial structure as distinct from market or commodity-use classifications.

Whether an index meets a given specific need depends largely upon its commodity coverage and its weighting structure. An important use of an output index weighted by gross shipment values is to deflate value series in order to arrive at measures of output in constant dollars. Most measures of output and productivity rely primarily upon physical quantity data for the various products of an industry, but in cases where quantity data are not available, deflated values can be used if suitable price indexes are available for use as deflators. Deflated value data also may serve as a check on production indexes prepared from quantity data and unit-value weights. There are many sectors of the economy for which the analysis of industrial output is severely limited because appropriate price indexes are not available.

Essentially the process of deflation provides a means of obtaining an estimate of quantity change from available data on total dollar value and a price index. If the dollar values themseves are divided by the price index, the resulting dollar values express the sales value in terms of purchasing power of the dollar as of the base period of the index. Or an index of dollar volume can be divided by the price index to obtain a production index.[9]

The output indexes also may be used for comparing movements of prices with other industry-based statistical measures such as employment, earnings, productivity, etc. Price indexes consistent with total shipments weights will be useful for deflating industry inputs. For example, the appropriate index for deflating the value of aluminum purchased by an industry would be the index whose components represent shipments of aluminum to buyers in this industry rather than the aggregate output of the primary aluminum industry.

Input price indexes will be especially useful to research departments in private industry as well as to public agencies in making cost studies. They should be consistent in coverage with BLS series on average hourly earnings, another important element of cost. For contract escalation, they will give index users a wider choice of indexes. Input price indexes, however, are not available yet.

There are a number of uses which combine output and input indexes. For example, gross output price indexes and materials input price indexes can be used to yield a measure of value added in constant dollars.

The prices used in contructing the currently published indexes are those regularly collected on a monthly basis and used in the calculation of the comprehensive Wholesale Price Index. These prices generally are at the primary market level but a few are at other levels. It must be assumed that these price movements are similar to the market level of sales represented by the Census data. To include interplant transfer values and values of goods produced and consumed in the same industry, it is necessary to assume that price movements of goods in commercial markets represent the price changes of goods not sold in commercial markets.

Until additional pricing can be done, these new indexes will be limited by the coverage—commodity and class of customer—of the comprehensive Wholesale Price Index.

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[9] It can be shown that division of the value index by the Laspeyres (base-year-weighted) price index yields a production index of the Paasche (current-year-weight) form. Division by the Paasche price index, conversely, yields a quantity index of the Laspeyres type. See Chapter 25, Output per Manhour Measures: Industries.

Technical References

Number

1. Evans, W. Duane and Hoffenberg, Marvin, "The Inter-Industry Relations Study for 1947," *The Review of Economics and Statistics*, May 1952, pp. 97–142.

   A description of scope, uses, and methodology of the U.S. Government's interindustry statistical study of 1947.

2. Goldman, Morris R.; Marimont, Martin L.; and Vaccara, Beatrice N., "The Inter-Industry Structure of the United States," *Survey of Current Business*, November 1964, pp. 10–29.

   A report showing preliminary results of the 1958 interindustry relations study and containing tables of the percent distribution of 1958 gross output in 86-industry detail.

3. Moss, Bennett R., "Industry and Sector Price Indexes," *Monthly Labor Review*, August 1965, pp. 974–982.

   Contains price indexes for about 50 4-digit (Standard Industrial Classification) industries, together with a technical note on concepts, methodology, and uses.

4. National Bureau of Economic Research, "Input-Output Relations and Appraisal," *Studies in Income and Wealth*, vol. 18, New York, 1955.

   A description of scope, uses, and significance in economic analysis of the U.S. Government's interindustry statistical study of 1947.

5. ———. The Price Statistics of the Federal Government, New York, 1960.

   An appraisal of price statistics of the Federal Government by the Price Statistics Review Committee of NBER, covering uses, concepts, collection, and publication, sampling, and other aspects of the Consumer Price Index, Wholesale Price Index, Index of Prices Paid by Farmers, and other Price measures.

6. U.S. Congress, Joint Economic Committee. *Government Price Statistics, Hearings before the Subcommittee on Economic Statistics, Part I and Part II*, Washington, D.C., 1961.

   Part I represents the report, *The Price Statistics of the Federal Government*, prepared by the NBER (q.v.); Part II contains statements of private and government economists including the response by Ewan Clague, Commissioner of Labor Statistics.

—MARY E. LAWRENCE

Chapter 13. Spot Market Prices

Background

As early as January 1934, at the request of the U.S. Department of the Treasury, the Bureau of Labor Statistics began the computation of a daily commodity price index, using quotations for sensitive comodities. It was released first to the general public in January 1940. In 1952, in connection with the revision of all its major price index series, the Bureau issued a new Daily Index of Spot Market Prices. The new index was not a continuation of the old series, but was based on a new sample of 22 commodities and was calculated on a 1947–49 base; in contrast, the old index was based on 28 commodities and was calculated with August 1939 as base.

In January 1962, the 22-commodity index was recalculated on a 1957–59=100 base to correspond to the base period adopted for other Federal Government general purpose indexes. In January 1971, the index was rebased again in accordance with government-wide practice, this time to a 1967=100 base. In 1969, computation of the index on a daily basis was discontinued. Since then the index has been prepared for Tuesday of each week.

Description of Survey

The Spot Market Price Index is a measure of price movements of 22 sensitive basic commodities whose markets are presumed to be among the first to be influenced by changes in economic conditions. As such, it serves as one early indicator of impending changes in business activity.

The commodities used are in most cases either raw materials or products close to the initial production stage which, as a result of daily trading in fairly large volume of standardized qualities, are particularly sensitive to factors affecting current and future economic forces and conditions. Highly fabricated commodities are not included for two reasons: (1) they embody relatively large fixed costs which fact causes them to react less quickly to changes in market conditions; and (2) they are less important as price determinants than the more basic commodities which are used throughout the producing economy.

A *spot* price is a price at which a commodity is selling for immediate delivery. In the absence of a spot price, a *bid* or an *asked* price may be used. Some of the prices used are *nominal* prices in that they are not actual transaction prices. Often they are *exchange* prices—a price for a completely standard commodity which eliminates the effect of minor quality changes on actual transaction prices.[1] Trade publications may use this type of price for commodities such as cocoa beans, coffee, and wool tops. The price for print cloth is an average of spot price and price for most distant forward contract because it was determined that a large part of the sales of print cloth are made on a contract basis.

The 22 commodities are combined into an "All Commodities" grouping, with two major subdivisions: Raw Industrials, and Foodstuffs. Raw Industrials include burlap, copper scrap, cotton, hides, lead scrap, print cloth, rosin, rubber, steel scrap, tallow, tin, wool tops, and zinc. Foodstuffs include butter, cocoa beans, corn, cottonseed oil, hogs, lard, steers, sugar, and wheat.

The items upon which the index is based are classified further into four smaller groups: Metals, Textiles and Fibers, Livestock and Products, and Fats and Oils. However, some of the 22 commodities do not fall into one of these four groupings. For example, sugar is not included in any special group. Furthermore, the groupings are not mutually exclusive. Lard, for instance, is in both the Livestock and Products Index and in the Fats and Oils Index.

Data Sources and Collection Methods

The prices used in the index are obtained from trade publications or from other Government agencies. Prices for cocoa beans, steers, sugar, wheat, burlap, copper scrap, cotton, lead scrap, print cloth (spot), rosin, rubber, steel scrap, wool tops, and zinc, are of the same specification and source as those used in the comprehensive monthly Wholesale Price Index.[2] Prices for butter, corn, hides, hogs, lard, tallow, and tin are either differently specified spot prices or from different markets.

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[1] Exchanges which issue spot prices have committees to make a determination of the spot price for the standard commodity.

Selection of Products

The criteria for the selection of commodities were (1) wide use for further processing (basic), (2) freely traded in an open market, (3) sensitive to changing conditions significant in those markets, and (4) sufficiently homogeneous or standardized so that uniform and representative price quotations can be obtained over a period of time.

Subject to these restrictions, efforts were made to include representative sensitive commodities from as large a segment of the economy as possible. Also, the influence of international markets upon the economy was taken into account by the inclusion of some key commodities (such as crude rubber and tin) which are important in international trade. Both in the sample and in the index structure, an attempt was made to prevent price movements of agricultural products from dominating the movement of the index.

Estimating Procedures

The Spot Market Index is an unweighted geometric mean[3] of the individual commodity price relatives, i.e., of the ratios of the current prices to the base period prices. The use of the geometric mean has the advantage that the index is not dominated by extreme price movements of individual commodities. Since extremely large movements may be atypical, it was deemed better to minimize their effects, even at the expense of losing the effect of large representative changes. However, the fact that each of the commodities is unweighted in the index means that a price change for rosin, a comparatively unimportant commodity, has as much effect as an equal percentage movement in the price of a very important commodity such as wheat, cotton, or steel scrap.

The computation procedure involves obtaining for each commodity the ratio of its price in any given period to its price in the base period and taking the 22nd root of the product of these ratios. This product is then multiplied by 100 to obtain the index number for each period. The calculation is made by means of logarithms. The formula reduces to

$$\frac{\text{Log } I_k = \Sigma \text{ Log } P_k - \Sigma \log P_o + 44}{22}$$

where

I_k = Index for a given day
P_k = Price for a given day
P_o = Average (geometric) price in base period
44 = Logarithmic constant which when divided by 22 equals log of 100.

Monthly average indexes are obtained according to the previous procedure, except that P_k=the geometric average of the Tuesday prices (daily prices prior to 1969) over the month. In maintaining the index over time, it may be necessary to change commodity specifications or substitute entirely new products. These changes are handled by a statistical linking procedure so that only actual price movements are reflected in the index.

Analysis and Presentation

Tuesday spot market indexes and prices are published each week, on the Friday following the day of reference. A summary of weekly indexes and the average for each month are published with the first weekly release of the following month. Beginning with 1950, historical indexes are shown for Tuesday of each week together with monthly averages; from July 1946 through 1949 indexes are listed for Tuesday of each week only. In addition, indexes are published for selected earlier dates: August 15, 1939, December 6, 1941, August 17, 1945, and June 28, 1946.

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[2] See Chapter 11, Wholesale Prices.

[3] The geometric mean of n figures is the nth root of their product. Thus, the geometric mean of the numbers 1.5, 2.0, and 9.0 is 3.0 ($1.5 \times 2 \times 9 = 27$. $\sqrt[3]{27} = 3$). The arithmetic mean, is 4.2.

Uses and Limitations

A survey of users in 1964 showed that the Index is frequently used as a general economic indicator, for gaging the direction of basic prices, for forecasting general price movements, and for current prices of specific commodities. Other uses, frequently mentioned, are for market research and for comparing price trends with the user's selling or buying prices.

The Tuesday Index of Spot Market Prices differs from the Wholesale Price Index in method of construction and weighting, as well as in the sample of items for which prices are included. While it is independent of the monthly comprehensive index, changes in the Tuesday Index or its components may foreshadow turns in Wholesale Price Indexes. However, the Tuesday Index is not a good indicator of current price trends for the whole economy. For this purpose, the comprehensive Wholesale Price Index should be used. The Tuesday Spot Market Index is, by design, very sensitive to price changes in basic commodities but, because of its unweighted structure, the magnitude of changes in any of the index groups cannot be used as a reliable measure of the general price change of all commodities within the groups.

For many of the 22 items, the commodity exchange prices are based upon transactions which cover as little as 25 percent of the total sold in all markets. In some cases, the price is set by a committee of experts from the commodity exchange for a standardized commodity. Also, when there are not enough transactions from which to obtain an actual market price, a "nominal" spot price is set. From this, it is apparent that the exchange prices may not always be representative of the large volume of private transactions occurring outside the organized market. However, it is believed that the reported exchange prices generally are used as the basis for private negotiations.

Composition of Grouping Indexes

Metals: Copper scrap, lead scrap, steel scrap, tin, and zinc.

Textiles and Fibers: Burlap, cotton, print cloth, and wool tops.

Livestock and Products: Hides, hogs, lard, steers, and tallow.

Fats and Oils: Butter, cottonseed oil, lard, and tallow.

Specifications for Commodities Included in the Index as of March 1971

Commodity	*Specifications*	*Market*
Burlap	10 oz., 40", ex-dock or ex-warehouse, duty paid, per yd.	New York.
Butter	Grade A, 92 score, per lb.	Chicago.
Cocoa beans	Accra, per lb.	New York.
Copper scrap	No. 1 heavy copper and wire, refiners' buying price, carload lots, delivered buyers' works, per lb.	New York.
Corn	No. 3 yellow, per bu.	Chicago.
Cotton	Middling, $1\frac{1}{16}$", per lb.	12 markets.
Cottonseed oil.	Crude, Valley, per lb.	Memphis.
Hides	Cow, light native, packer 30/53 lbs., fleshed, packer to tanner, dealer, or exporter per lb., f.o.b. shipping point.	Chicago.
Hogs	U.S. No. 2's and 3's, 200–220 lbs., per 100 lb.	Omaha.
Lard	Prime Steam, in tanks, per lb.	Chicago.
Lead scrap	Battery plates, smelters' buying price, East, carload lots; delivered buyers' works, per lb.	New York.
Print cloth	48", 78x78 count, 4 yds./lb. spot and nearby, per yd.	New York.
Print cloth	48", 78x78 count, 4 yds./lb., most distant contract, per yd.	New York.
Rosin	Gum, WG grade, carlots, per 100 lb.	New York.
Rubber	Crude, natural, No. 1 Ribbed Smoked Sheets, per lb.	New York.
Steel scrap	No. 1 heavy melting, (dealer), consumers' buying price, including brokerage, delivered, per gross ton.	Chicago.
Steers	Choice, 900–1100 lbs., per 100 lb.	Omaha.
Sugar	Raw, 96°, duty paid, per 100 lb.	New York.
Tallow	Fancy, bleachable, inedible, per lb.	Chicago.
Tin	Grade A, spot delivery, per lb.	New York.
Wheat	No. 1 Dark Northern Spring, per bu.	Minneapolis.
Wheat	No. 1 Hard Winter Ord., per bu.	Kansas City.
Wool tops	Certificated spot price, nominal, per lb.	New York.
Zinc	Slab, Prime Western, for prompt delivery, delivered, (f.o.b. New York equivalent), per lb.	New York.

—LLOYD E. WIGREN

Wages and Industrial Relations

Chapter 14. Occupational Pay and Supplementary Benefits

Background

The Bureau of Labor Statistics, for many decades, has conducted studies of wages by occupation and industry, based upon employer records. The Bureau's first such study, growing out of a study by the U.S. Senate in 1891, resulted in a wage rate record extending back continuously to 1860. Systematic collection of wage data by occupation and industry has continued since the turn of the century; changes in coverage has been dictated mainly by government requirements. A large survey program undertaken for the War Industries Board in 1919 produced occupational pay rates by industry and State, and (for some industries) by city. Between 1934 and 1940, the selection of industries studied was determined largely by administrative needs under the National Recovery Act, Public Contracts Act, and the Fair Labor Standards Act, with emphasis on nationwide data for relatively low-wage industries.

Survey activity shifted in the 1940–41 defense period to heavy industries essential to war production. Implementation of wage stabilization policy during the war required a large-scale program of occupational wage studies by industry and locality. The emphasis on data by locality has continued since 1945 within the framework of industry studies generally designed to also yield national and regional estimates. In addition, the Bureau developed two new types of surveys.

Area wage surveys, initiated in the late 1940's, were designed to meet the growing demand for pay data related to office clerical and manual jobs that are common to a wide variety of manufacturing and nonmanufacturing industries within metropolitan areas. This survey program was firmly established and temporarily expanded for use in the wage stabilization effort during the Korean emergency. The need for nationwide estimates of white-collar pay in private industry for use in appraising the Federal white-collar salary structure resulted in a survey design that would produce national averages, based on an area sample. Data for individual areas studied also serve the wage administration needs for other government agencies.

Prior to 1960, studies in a very few professions provided salary data. Beginning in that year, salary surveys have been made on a nationwide basis covering professional, administrative, and technical jobs in a broad spectrum of industries. Averages for these jobs, together with national averages for clerical and drafting jobs included in the area wage surveys, are utilized by the administrative agencies directly concerned with Federal pay matters.

Description of Surveys

Although differing in industrial, geographic, and occupational coverage, the three types of surveys described form an integrated program of occupational wage surveys based upon a common set of administrative forms, manual of procedures, and common concepts and definitions. Employer cooperation in surveys is on a voluntary basis. Confidential individual establishment data compiled by the Bureau's field economists are grouped in published reports in a manner that will avoid possible disclosure of an establishment's rates. Establishments included in all surveys are classified by industry as defined in the 1967 edition of the *Standard Industrial Classification Manual* prepared by the U.S. Office of Management and Budget.[1] Survey reports identify the minimum size of establishment (measured by total employment) studied. Definitions for *Standard Metropolitan Statistical Areas* are employed in all programs.[2]

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[1] See appendix B.

[2] See appendix C.

Industry wage surveys provide data for occupations selected to provide representativeness of the range of rates, methods of wage payment, and of men's and women's work activities. Consideration also is given, in their selection, to the prevalence in the industry, definiteness and clarity of duties, and importance as reference points in collective bargaining.

In addition to collecting straight-time first-shift rates (or hours and earnings for incentive workers) for individual workers in the selected occupations, surveys in most industries also establish the wage frequency distribution for broad employment groups, i.e., production and related workers or nonsupervisory workers. Weekly work schedules; shift operations and differentials; paid holiday and vacation practices; and health, insurance, and pension benefits are included in the information collected, along with the provisions made for other items, applicable to certain industries. The studies also provide estimates of labor-management agreement coverage, proportions employed under incentive pay plans, and the extent to which establishments provide a single rate or range of rates for individual job categories.

Fifty manufacturing and 20 nonmanufacturing industries, accounting for about 22.5 million employees, are surveyed on a regularly recurring basis. A majority are studied on a 5-year cycle, but a number of comparatively low-wage industries are on a 3-year cycle. In addition, special wage surveys also are undertaken at the request of other government agencies.

Nearly all of the manufacturing, utilities, and mining industries are studied on a nationwide basis and estimates are provided also for regions and major areas of concentration. Surveys in trade, finance, and service industries usually are limited to a score or more of metropolitan areas. Nationwide surveys generally develop separate estimates by size of establishment, size of community, labor-management agreement coverage, and type of product or plant group.

Area wage surveys provide data for occupations common to a wide variety of industries in the communities surveyed. The 76 occupational categories studied include 31 office clerical; 15 electronic data processing, drafting, and industrial nurses; and 30 maintenance, toolroom, powerplant, and custodial and material movement jobs. Thus, they provide representation of the range of duties and responsibilities associated with white-collar, skilled maintenance trades, and other "indirect" manual jobs. Weekly salaries reported for individuals in white-collar jobs relate to regular straight-time salaries that are paid for standard workweeks. Average hourly earnings for maintenance and other manual jobs relate to first-shift hourly rates.

Industry divisions included are (1) manufacturing; (2) transportation, communication, and other public utilities; (3) wholesale trade; (4) retail trade; (5) finance, insurance, and real estate; and (6) selected service industries. Establishments employing fewer than 50 workers are excluded—with a minimum of 100 applying to manufacturing; transportation, communication, and other public utilities; and to retail trade in the dozen largest communities.

In addition to the all-industry averages and distributions of workers by earnings classes, separate data are provided for manufacturing and nonmanufacturing in each area and, wherever possible, for individual industry divisions in the nonmanufacturing sector. Among the 89 Standard Metropolitan Statistical Areas in this annual survey program as of 1971, separate data are provided for transportation, communication, and other public utilities in 88 areas; for retail trade in 25 areas; for wholesale trade and finance, insurance, and real estate in 17 areas; and for the selected service industries in 8 large areas. In 22 of the larger areas, wage data are presented separately for establishments that have 500 workers or more.

Data on weekly work schedules; paid holiday and vacation practices; and health, insurance, and pension benefits are recorded separately for nonsupervisory officeworkers and plant workers (nonoffice). Shift operations and differentials are collected for plantworkers in manufacturing. Data on minimum entrance rates for inexperienced officeworkers are collected in all industries. These items are studied biennially in all areas. This survey program also has developed information on profit-sharing plans, characteristics of sick leave plans, wage payment systems, and other items related to employee compensation.

Special area wage surveys have been conducted annually since 1967 at the request of the Employment Standards Administration for use in administering the Service Contract Act of 1965. The surveys also meet the needs of the general public and provide information on hourly earnings for 14 office occupations; 22 maintenance, toolroom, powerplant, and custodial and material movement jobs; 7 laundry jobs; and 6 food service jobs.

The industrial scope includes manufacturing; transportation, communication, and other public utilities; and wholesale trade industry divisions; and general merchandise stores; eating and drinking places; real estate, hotels and other lodging places; engineering and architectural services; personal services; and miscellaneous business services. Data on incidence of paid holidays and vacation practices, and health insurance and pension benefits are provided biennially.

The National Survey of Professional, Adminstative, Technical, and Clerical Pay provides a fund of broadly based information on salary levels and distributions in private employment. The 80 occupation-work levels studied were selected from the following fields: Accounting, legal services, personnel management, engineering and chemistry, buying, clerical supervisory, drafting, and clerical. Definitions for these occupations provide for classification of employees according to appropriate work levels (or classes). Although reflecting duties and responsibilities in industry, the definitions were designed to be translatable to specific pay grades in the General Schedule applying to Federal Classification Act employees. This survey, thus, provides information in a form suitable for use in comparing the compensation of salaried employees in the Federal civil service with pay in private industry.

Average salaries, monthly and annual for all occupations and also on a weekly basis for clerical and drafting, relate to the standard salaries that were paid for standard work schedules, i.e., to the straight-time salary corresponding to the employee's normal work schedule, excluding overtime hours. Nationwide salary distributions and averages are presented for men and women combined. Averages also are presented for establishments in metropolitan areas combined and for establishments employing 2,500 workers or more.

Industry divisions included are: (1) manufacturing, (2) transportation, communication, electric, gas and sanitary services, (3) wholesale trade, (4) retail trade, (5) finance, insurance, and real estate, and (6) engineering and architectural services, and commercially operated research, development, and testing laboratories.

Limited to the Nation's metropolitan areas for the years 1960 through 1964, the annual survey was expanded in 1965 to include nonmetropolitan counties. The minimum establishment size included in the survey was raised from 100 to 250 in 1961. In 1966, the minimum establishment size was lowered to 100 in transportation, communication, and the other public utilities; wholesale trade; and the service industries studied. The minimum was also lowered to include establishments with 50 workers in the finance, insurance, and real estate industries. Since the survey scope is subject to change, users are directed to the Scope and Method of Survey appendix in the reports for a description of current practice.[3]

Concepts. The Bureau's occupational wage surveys summarize a highly specific wage measure—the rate of pay, excluding premium pay for overtime and for work on weekends, holidays, and late shifts, for individual workers. In the case of workers paid under piecework or other types of production incentive pay plans, an earned rate is computed by dividing straight-time earnings for a time period by corresponding hours worked. Production bonuses, commissions, and cost-of-living bonuses are counted as earnings. In general, bonuses that depend on factors other than the output of the individual worker or group of workers are excluded; examples of such nonproduction payments are safety, attendance, year-end or Christmas bonuses, and cash distributions under profitsharing plans.

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[3] The terms "in scope" or "within scope" are used throughout this chapter to refer to the coverage of the particular survey being described.

Unless stated otherwise, rates do not include tips or allowances for the value of meals, room, uniform, etc. The earnings figures, thus, represent cash wages (prior to deductions for social security, taxes, savings bonds, premium payments for group insurance, meals, room or uniforms) after the exclusion of premium pay for overtime, weekend, holiday, or late shift work.

Hours shown for salaried occupations relate to standard weekly hours for which the employee receives his regular straight-time salary.

Occupational classifications are defined in advance of the survey. Because of the emphasis on interestablishment and interarea comparability of occupational content, the Bureau's job descriptions may differ significantly from those in use in individual establishments or those prepared for other purposes. The job descriptions used for wage survey purposes are typically brief and usually more generalized than those used for other purposes. The primary objective of the descriptions is to identify the essential elements of skill, difficulty, and responsibility that establish the basic concept of the job.[4]

Although work arrangements in any one establishment may not correspond precisely to those described, those workers meeting the basic requirements established for the job are included.[5]

In applying these job descriptions, the Bureau's field representatives exclude working supervisors, apprentices, learners, beginners, trainees, handicapped workers, part-time or temporary workers, and probationary workers unless provision for their inclusion is specifically stated in the job description.

Paid holidays, paid vacations, and health, insurance, and pension plans are treated statistically on the basis that these are applicable to all nonsupervisory plant or office workers if a majority of such workers are eligible or can expect eventually to qualify for the practices listed. Data for health, insurance, and pension plans are limited to those plans for which at least a part of the cost is borne by the employer. Informal provisions are excluded.

Survey Methods

Planning. Consultations are held with appropriate management, labor, and Government representatives to obtain views and recommendations related to scope, timing, selection, and definitions of survey items, and types of tabulations. Particularly in planning surveys in specific industries, these discussions importantly supplement comments and suggestions received from the regional offices at the conclusion of the previous study. Reflecting its use in evaluation of Federal white-collar pay, the design of the National Survey of Professional, Administrative, Technical, and Clerical Pay was developed in conjunction with the Office of Management and Budget and the Civil Service Commission. Changes in the survey scope, item coverage, and job definitions are initiated by these agencies.

The industrial scope of each survey is identified in terms of the classification system provided in the *Standard Industrial Classification Manual.* The scope may range from part of a

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[4] An example of a job description:

Machinist, Maintenance

Produces replacement parts and new parts in making repairs of metal parts of mechanical equipment operated in an establishment. Work involves *most of the following:* Interpreting written instructions and specifications; planning and laying out of work; using a variety of machinist's handtools and precision measuring instruments; setting up and operating standard machine tools; shaping of metal parts to close tolerances; making standard shop computations relating to dimensions of work, tooling, feeds, and speeds of machining; knowledge of the working properties of the common metals; selecting standard materials, parts, and equipment required for his work; and fitting and assembling parts into mechanical equipment. In general, the machinist's work normally requires a rounded training in machine-shop practice usually acquired through a formal apprenticeship or equivalent training and experience.

[5] In general, workers are included in a classification if the duties as described are performed a major part of the time and the remainder is spent on related duties requiring similar or lesser skill and responsibility. However, in some jobs, particularly office and skilled production-worker categories, workers may regularly perform a combination of duties involving more than one occupation. Unless indicated otherwise in the description, in these situations consideration for classification purposes is given to those elements of the job which are most important in determining its level for pay purposes. Thus, a worker meets the basic concept of the stenographer classification if taking of dictation is a regular requirement of the job even though a majority of time is spent on routine typing.

4-digit code for an industry study to a uniform combination of broad industry divisions and specific industries for the area wage surveys or the salary survey of professional, administrative, technical, and clerical jobs. The needs of major users are a major consideration in designing the multi-purpose occupational studies.

The minimum size of establishment included in a survey is set at a point where the possible contribution of the excluded establishments is regarded as negligible for most of the occupations surveyed. Another practical reason for the adoption of size limitations is the difficulty encountered in classifying workers in small establishments where they do not perform the specialized duties indicated in the job definitions.

Considerations in timing of industry surveys include date of expiration of major labor-management agreements, deferred wage adjustments, seasonality of production (e.g., garments), and interests of users. Wherever possible, area wage surveys are timed to follow major wage settlements as well as to meet the needs of government agencies engaged in wage administration as required by law.

The types of occupations studied and criteria used in their selection were identified in the description of the various types of surveys. The job list for each survey is selected to represent a reasonably complete range of rates in the wage structure for the employment categories involved, i.e., production and related workers in a specific manufacturing industry or nonsupervisory office, maintenance, material handling, and custodial workers in a metropolitan area. The established hierarchy of job rates to be found within establishments and industries permits the use of pay data for such key or benchmark jobs for interpolating rates for other jobs. Technological developments or user interests may dictate changes in the job lists and definitions. New definitions for jobs usually are pretested in a variety of establishments prior to their use in a full-scale survey.

Questionnaires. Two basic schedules are used in obtaining data in all surveys. The first (BLS 2751A) includes items relating to products or services, employment, shift operations and differentials, work schedule, overtime premiums, paid holidays and vacations, insurance and pension plans, union contract coverage, and other items applicable to the establishment. The second (BLS 2753G) is used in recording occupation, sex, method of wage payment, hours (where needed), and pay rate or earnings for each worker studied. Supplementary forms are used to meet particular needs.

Collection. Bureau field economists collect data by personal visit to each of the sample establishments. Job functions and factors in the establishment are carefully compared with those included in the Bureau job definitions. The job matching may involve review of records such as pay structure plans and organizational charts, company position descriptions, interviews with appropriate officials, and, on occasion, observation of jobs within plants. A satisfactory completion of job matching permits acceptance of company-prepared reports where this procedure is preferred by the respondent. Generally, however, the field economist secures wage or salary rates (or hours and earnings, when needed) from payroll or other records and data on the selected employer practices and supplementary benefits from company officials, company booklets, and labor-management agreements.

Area wage surveys in all areas involve personal visits every second year with partial collection by mail in the intervening years. Establishments participating in the mail collection receive a transcript of the job matching and wage data obtained a year earlier by the field economist, together with the job definitions. The up-dated returns are scrutinized and questionable entries are checked with the respondent. Personal visits are made to establishments not responding to the mail request and to those reporting unusual changes from year-earlier data.

The work of all field economists is checked for quality of reporting, with particular attention directed to accuracy in job matching. The revisits are made by supervisory and senior economists. Systematic technical audits of the validity of survey definitions, made by staff with specialized training, also are maintained for the technically complex nationwide white-collar salary survey.

BLS 2751A
(Rev. January 1970)

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

Budget Bureau No. 44-R0338
Approval expires November 30, 1972

WAGE SURVEY GENERAL ESTABLISHMENT INFORMATION

Your report will be held in confidence

1. ESTABLISHMENT IDENTIFICATION

A. Survey	Payroll Period 19__	Payroll Period 19__
ESTABLISHMENT NAME		
STREET ADDRESS	CITY	
COUNTY, STATE AND ZIP CODE	AREA CODE - TELEPHONE	
NAME AND TITLE OF AUTHORIZING OFFICIAL 19__	NAME AND TITLE OF OFFICIAL SUPPLYING DATA	
19__		
ADDRESS OF OFFICE FROM WHICH DATA WAS OBTAINED, IF DIFFERENT FROM ABOVE		
B. Central Office *(Complete if clearance* ☐ *and/or data* ☐ *obtained from this source)*	TELEPHONE	
NAME OF COMPANY	NAME OF AUTHORIZING OFFICIAL	
STREET ADDRESS	CITY, STATE AND ZIP CODE	
		TITLE

2. CURRENT PRODUCTS OR SERVICES AND PROCESSES

A. PRODUCT OR SERVICE	APPROXIMATE % ANNUAL VALUE	PRODUCT OR SERVICE	APPROXIMATE % ANNUAL VALUE	B. SCOPE OF OPERATIONS
19__		19__		

3. OFFICE USE ONLY

YEAR	SCHEDULE NO. 1-5	IDENT. 6-8	AREA 9-11	REGION 12	STATE 13-14	CITY SIZE 15	SIC CODE 16-19	EST. SIZE 20	UNION 21	WEIGHT* 22-24	SPECIAL CHAR-ACTERISTICS (1) 25-27	(2) 28-30
19____												
19____												

BLS 2751A–Continued
(Rev. January 1970)

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

SURVEY	PAYROLL PERIOD	SCHEDULE NO.
ESTABLISHMENT		

5. UNION CONTRACT COVERAGE

		No	Yes	
A. Are a majority of your production workers covered by union agreements?	31	0 ☐	1 ☐	☐
B. Are a majority of your office workers covered by union agreements?	32	0 ☐	1 ☐	☐

C. With what unions does this establishment have contracts? *(Give name and affiliation below.)*	D. What occupational groups are covered by the contract? *(List groups below opposite the appropriate union.)*
Production Workers:	
Office Workers:	

6. ESTABLISHMENT EMPLOYMENT (APPROXIMATE)

A. What is the approximate total employment* in this establishment?	33-38	
B. How many are nonsupervisory production (plant) workers?	39-43	
Men	44-48	
Women	49-53	
C. Nonsupervisory office workers?	54-58	
Men	59-63	
Women	64-68	
D. Other employees (executive, professional, supervisory, etc.)?	69-73	
E.	74-78	
F.		
	End of card→80	1

*Includes salaried officers of corporations but does not include proprietors, members of unincorporated firms, pensioners, members of the armed forces carried on the payroll, or unpaid family workers.

G. Remarks

BLS 275 30
Rev. 65

OCCUPATIONAL RATES

Payroll period________

Schedule No. Est. Name

Page

OCCUPATION AND GRADE	Occupational code (1)	Sex (2)	Method of pay (3)	Number of workers (4)	Hours (5)	Salary, rate, or earnings (6)	Line No. (7)	(8)
							1	
							2	
							3	
							4	
							5	
							6	
							7	
							8	
							9	
							10	
							11	
							12	
							13	
							14	
							15	
							16	
							17	
							18	
							19	
							20	
							21	
							22	
							23	
							24	
							25	
							26	
							27	
							28	

Sampling

The sampling design employed is almost always highly stratified. Before the sample is selected, information on all known establishments that might possibly fall within the scope of the survey is compiled from lists provided by regulatory governmental agencies (primarily State unemployment insurance agencies), supplemented by data from trade directories, trade associations, labor unions, and other sources.

Establishments then are stratified as precisely as available information permits. Each geographic-industry unit for which a separate analysis is to be presented is sampled independently. Within these broad groupings, a finer stratification by product (or other pertinent attributes) and size of establishment is made. Stratification may be carried still further in certain industries: textile mills, for instance, are classified on the basis of integration, i.e., whether they spin only, weave only, or do both. Such stratification is highly important if the occupational structure of the various industry segments differs widely.

The sample for each industry-area group is a probability sample, each establishment having a predetermined chance of selection. In order to secure maximum accuracy at a fixed level of cost (or a fixed level of accuracy at minimum cost), the sampling fraction used in the various strata ranges downward from all large establishments through progressively declining proportions of the establishments in each smaller size group, in accordance with the principles of optimum allocation. Thus, each sampled stratum will be represented in the sample by a number of establishments roughly proportionate to its share of the total employment. Though this procedure may appear at first to yield a sample biased by the over-representation of large firms, the method of estimation employed avoids the possibility of bias by the assignment of proper weights to the sample establishments.

In the event a sample establishment within scope is unable to supply usable data, a substitute is assigned in the same industry-location-size class. (Since no close relation exists between failure to participate in these surveys and the items being studied, little bias is introduced by this procedure.) The overall nonresponse rate in published surveys averages about 5 percent, and in exceptional cases reaches 10 percent.

The size of the sample in a particular survey depends on the size of the universe, the diversity of occupations, and their distribution, the relative dispersion of earnings among establishments, the distribution of the establishments by size, and the degree of accuracy required. Estimates of variance based on data from previous surveys are used in determining the size of the sample needed.

As indicated earlier, area wage surveys are limited to selected metropolitan areas. These areas, however, form a sample of all such areas, and, when properly combined (weighted), yield estimates of the national and regional levels.

The sample of areas is based on the selection of one area from a stratum of similar areas. The criteria of stratification are region, type of industrial activity as measured by percentage of manufacturing employment, major industries, and level of earnings in manufacturing. Each area was selected with probability proportionate to its nonagricultural employment.

The largest metropolitan areas are self-representing, i.e., each one forms a stratum by itself and is certain of inclusion in the area sample. The area sample contained about 80 percent of all nonagricultural employment of the metropolitan area complex of the entire country in 1970.

In some strata it was impossible to give some areas their proper chance of selection, because of difficulties in making surveys in these areas primarily due to predominance of single employers. Then, too, some areas were chosen to represent some strata because of interest in the area of itself. These departures from a strict probability design, covering only 14 percent of the total, are believed to be negligible in their effect.

Estimating Procedures

Estimated average earnings (hourly, weekly, monthly, or annual) for an industry or an occupation are computed as the arithmetic mean of the individual employees' earnings. They are not estimated by dividing total payrolls by the total time worked, since such information almost never is available on an occupational basis.

All estimates are derived from the sample data. The averages for occupations, as well as for industries, are weighted averages of individual earnings and not computed on an establishment basis. The proportion of employees affected by any fringe provision likewise is estimated from the sample; all workers in each establishment are considered to be covered by the predominant benefit policy in effect, and the entire employment of the establishment is classified accordingly.

As mentioned previously, the use of a variable sampling ratio in different strata of the population would result in biased estimates if straight addition of the data for the various establishments were made. Therefore, each establishment is assigned a weight that is the inverse of the sampling rate for the stratum from which it was selected—e.g., if a third of the establishments in one stratum are selected, each of the sampled establishments is given a weight of 3.

To illustrate the use of weights, suppose the universe were 7 establishments, from which a sample of 3 was selected. Assume that establishment A was drawn from a cell, or stratum, in which half of the plants were used in the sample. It therefore, is, given a weight of 2. Establishment B, on the other hand, was taken with certainty (or a probability of 1) and is thus given a weight of 1. Establishment C was taken from a group where a fourth of all plants were used in the sample, and hence is given a weight of 4. The following calculations are made in estimating average earnings for a given occupation.

		Workers in occupation in sample establishments at specified rate		*Estimates of total in stratum*	
Establishment	*Weight*	*Total number*	*Average hourly earnings*	*Workers*	*earnings*
A	2	40	$1.60	2×40	2×40×$1.60
B	1	30	1.70	1×30	1×30× 1.70
		20	1.95	1×20	1×20× 1.95
C	4	10	1.65	4×10	4×10× 1.65
Estimated universe				170	$284.00

The estimated average hourly earning is thus $\frac{\$284.00}{170}$ or $1.67.

A similar method applies to any characteristic estimated from the sample. To estimate the proportion of employees in establishments granting paid vacations of 2 weeks after 2 years of service, for instance, the establishments are classified according to the length of vacation granted after 2 years' service, establishment weights are applied to employment, as in the previous example, and the proportion of the estimated employment in the 2-week category of the estimated total employment then is computed. Using the same three establishments as in the previous example, this can be illustrated as follows:

Establishment	*Weight*	*Actual total establishment employment*	*Weighted employment*	*Vacation provisions after 2 years*
A	2	100	200	1 week.
B	1	500	500	2 weeks.
C	4	75	300	1 week.
Estimated universe			1,000	

Thus, the estimated percentage of workers in establishments granting 2 weeks' vacation after 2 years of service is $\frac{500}{1{,}000}$ or 50 percent.

When a large establishment within survey scope, for which no substitute exists, is unable to supply data, the deficiency is alleviated by increasing the weight of the most nearly similar units. Should any segment be affected by a substantial amount of such noncooperation, the publication of materials will be diminished by omitting separate presentation of sectors seriously affected.

Where a sample of selected metropolitan areas is used to represent the totality of such areas, a second stage of weighting is used to expand the individual area totals to region and/or national estimates. Since, as indicated in the description of the sampling method, each area represents a stratum of similar areas, the total from each area are weighted to the estimated stratum totals by multiplying by the inverse of the chance of selection. This procedure provides the ratio of nonagricultural employment in the stratum to that in the sample area (one in the case of the large self-representing areas). Summing all such estimated stratum totals yields the earnings and employment totals for the region and the country as a whole.

Analysis and Presentation

Where an industry survey is designed to yield estimates for selected States or areas, these are published separately as information becomes available from all sample firms in the State or area unit. Industry surveys limited to selected areas do not provide a basis for the examinations of pay levels by size of community, size of establishment, product, or labor-management agreement coverage that generally are included in bulletin reports on nationwide surveys. Regardless of geographic scope, industry survey reports record the incidence of incentive pay plans and, to the extent possible, average pay levels separately for time and incentive workers.

Individual bulletin reports on individual area wage surveys are supplemented by two summary bulletins. The first compiles the results of individual area surveys made during a fiscal year. The second contains information on occupational earnings, employer practices, and suplementary wage benefits for all metropolitan areas combined and by industry division within the four broad census regions.

Wage-rate indexes are constructed for broad occupational categories, e.g., office clerical workers, skilled maintenance workers, and unskilled plant workers. These indexes are published annually, separately for all industries and manufacturing, for each metropolitan area studied, and for all metropolitan areas combined and by region. Area pay relatives for the three occupational categories are published annually, permitting ready comparisons of average pay levels among areas. Estimates of labor-management agreement coverage are also presented annually. Occupational pay relationships within individual establishments are summarized periodically.

Bulletin reports on the National Survey of Professional, Administrative, Technical, and Clerical Pay present occupational averages and distributions on an all-industry basis, nationwide and separately for all metropolitan areas combined, and for establishments employing 2,500 workers or more. Average pay levels for industry divisions are shown as percentages of the all-industry averages. Year-to-year percentage changes for occupation-work levels and trend estimates for occupations are reported.

Industry and area wage survey reports are issued throughout the year as the surveys are completed. The bulletin on the National Survey of Professional, Admistrative, Technical, and Clerical Pay is made available in March.

Summaries of the data in the bulletins and special analyses appear also in the *Monthly Labor Review.*

Uses and Limitations

Occupational wage data developed in these surveys have a variety of uses. They are used by Federal, State, and local agencies in wage and salary administration and in the formulation of public policy on wages, as in minimum wage legislation. They are of value to Federal and State mediation and conciliation services and to State unemployment compensation agencies in judging the suitability of job offers. Knowledge of levels and trends of pay rates by occupation, industry, locality, and region is required in the analysis of current economic developments and in studies relating to wage dispersion and differentials.

Bureau data are used in connection with private wage or salary determinations by employers or through the collective bargaining process. To the extent that wages are a factor, survey data also are considered by employers in the selection of location for new facilities and in cost estimating related to contract work.

Occupational wage survey programs are not designed to supply mechanical answers to questions of pay policy. As suggested earlier, limitations are imposed in the selection and definition of industries, of geographic units for which estimates are developed, of occupations and associated items studied, and in determination of periodicity and timing of particular surveys. Depending upon his needs, the user may find it necessary to interpolate for occupations or areas missing from the survey on the basis of knowledge of pay relationships.

Because of interestablishment variation in the proportion of workers in the jobs studied and in the general level of pay, the survey averages do not necessarily reflect either the absolute or relative relationships found in the majority of establishments. To illustrate, employment in the specialized maintenance crafts tends to be concentrated in the larger establishments, whereas employment in custodial and material-movement jobs is distributed more widely within an industry or area. Thus, to the extent that pay rates in the larger establishments vary from the average level, the skill differential measure based on the survey averages will differ to some degree from that obtainable within each of the larger establishments.

The incidence of incentive methods of payment may vary greatly among the occupations and establishments studied. Since hourly averages for incentive workers generally exceed those for hourly-rated workers in the same job, averages for some incentive-paid jobs may equal or exceed averages for jobs positioned higher on a job evaluation basis but normally paid on a time basis. Wherever possible, data are shown separately for time workers and incentive workers in the industry surveys. Incentive plans (generally plant-wide in application) apply to only a very small proportion of the workers in the indirect plant jobs studied in the area wage program.

Although year-to-year changes in averages for a job or job group primarily reflect general wage and salary changes or merit increases received by individuals, these averages also may be affected by changes in the labor force resulting from labor turnover, labor force expansions and reductions for other reasons, as well as changes in the proportion of workers employed in establishments with different pay levels. A labor force expansion might increase the proportion of lower paid workers and thereby lower the average, or the closing of a relatively high-paying establishment could cause average earnings in the area to drop.

Reliability of surveys. Results of the surveys generally will be subject to sampling error. This error will not be uniform, since, for most occupations, the dispersion of earnings among establishments and frequency of occurrence of the occupation differ. In general, the sample is designed so that the chances are 9 out of 10 that the published average does not differ by more than 5 percent from the average that would be obtained by enumeration of all establishments in the universe. That error applies to the smallest breakdown published. Hence, the error present in broader groupings will be somewhat less.

The sampling error of the percentage of workers receiving any given supplementary benefit differs with the size of the percentage. However, the error is such that rankings of predominant practices almost always will appear in their true position. Small percentages may be subject to considerable error, but will always remain in the same scale of magnitude. For instance, the proportion of employees in establishments providing more that 4 weeks' paid vacation to long-service employees may be given as 2 percent, when the true percentage for *all* establishments might be only 1 percent. Such a sampling error, while considerable, does not affect the essential inference that the practice is a rare one.

Estimates of the number of workers in a given occupation are subject to considerable sampling error, due to the wide variation among establishments in the proportion of workers found in individual occupations. (It is not unusual to find these estimates subject to sampling error of as much as 20 percent.) Hence, the estimated number of workers can be interpreted only as a rough measure of the relative importance of various occupations. The greatest degree of accuracy in these employment counts is for those occupations found principally in large establishments. This sampling error, however, does not materially affect the accuracy of the average earnings shown for the occupations. The estimate of average earnings is technically known as a "ratio estimate," i.e., it is the ratio of total earnings (*not* payrolls) to total employment in the occupation. Since these two variables are highly correlated (i.e., the errors tend to be in the same direction), the sampling error of the estimate (average hourly earnings) is considerably smaller than the sampling error of either total earnings or total employment.

Since completely current and accurate information regarding establishment products and the creation of new establishments is not available, the universe from which the sample is drawn may be incomplete. Sample firms incorrectly classified are accounted for in the actual field work, and the universe estimates are revised accordingly. Those firms which should have been included but were classified erroneously in other industries cannot be accounted for.

Since some measure of subjective judgment enters into the classification of occupations and other characteristics, there is some reporting variability in the results. A repetition of the survey in any establishment with different interviewers and respondents would undoubtedly produce slightly different results. However, when spread over a large number of establishments the differences, being random, would tend to balance out. Hence, analyses based on a small number of respondents must be used with care, even when all eligible establishments are included. No evidence of any consistent error has been uncovered.

Technical References

Number

1. Cohen, Samuel E., "Studies of Occupational Wages and Supplementary Benefits." *Monthly Labor Review*, March 1954 (pp. 292–297).

   An eariler description of the methods of wage surveys, similar to the present article.

2. Douty, H. M., "Survey Methods and Wage Comparisons." *Labor Law Journal*, April 1964 (pp. 222–230).

   A discussion of the uses of wage survey results, and the pitfalls to be avoided. A short discussion of the factors affecting survey methods is also included.

3. Kanninen, Toivo P., "New Dimensions in BLS Wage Survey Work." *Monthly Labor Review*, October 1959 (pp. 1081–1084).

   An outline of the occupational wage survey programs, as expanded in fiscal 1960. Lists the type of survey and cycle for each of 70 industries studied separately, and identifies the area sample as originally determined for the labor market survey program.

—GEORGE L. STELLUTO

Chapter 15. Employee Earnings and Hours Frequency Distributions

Background

An extensive program of studies of the frequency distribution of employee earnings has been maintained by the Bureau of Labor Statistics since 1954. Although the need for such data had long been recognized and some work had been done in the area, the program did not receive its full impetus until 1955 when Congress, in an amendment to section 4(d) of the Fair Labor Standards Act, directed the Secretary of Labor to include in his annual report an evaluation and appraisal of minimum wages established by the act and his legislative recommendations.[1] To meet these requirements, the program of employee earnings distributions studies was established. Since 1964, frequency distributions of weekly hours of work have been a part of this program.

This program was initiated to provide knowledge about the internal structure of earnings and hours which an average does not reveal. For example, distribution studies show whether earnings or hours are dispersed evenly or tend to be clustered around one or more points; they show the gap between the highest and lowest paid workers; they reveal the proportions of employees working short or long hours, and similar information on individual earnings and hours. They serve to locate the employed "poor," i.e., those not sharing in the general rise in living standards available from work.

Description

Studies of employee earnings and hours distributions generally include within their scope all nonsupervisory employees. No attempt is made to classify employees by occupation, although at times information is collected separately for some types of employees. The data collected relate to straight-time hourly earnings, excluding premium pay for overtime work and for work on weekends, holidays, and late shifts. Incentive pay, production bonuses, and cost-of-living payments are included in earnings, but nonproduction bonuses (e.g., Christmas bonuses) are not. Hours information is collected for hours worked during the week and for hours spent on vacations, holidays, or sick leave for which pay is received. Earnings and hours information is obtained for each employee, making it possible to calculate average hourly earnings and weekly hours of work for the entire group as well as to show the distribution of employees by earnings, hours, or both.

Two basic types of distributions studies are conducted—industry and area.[2] Industry studies may have broad coverage, such as manufacturing or wholesale trade, or they may be limited to specific industries, such as motor carriers. While these studies usually are conducted on a nationwide basis, they sometimes (especially in the case of specific industry studies) are limited to one or several areas in which the industry is concentrated. Industries are defined on the basis of descriptions in the current Standard Industrial Classification Manual, published by the Office of Management and Budget.[3]

Area studies are limited in geographic coverage, perhaps to a Standard Metropolitan Statistical Area,[4] to a county or a group of contiguous counties, or to a region or part of a region. This type of study usually is conducted on a cross-industry basis—that is, earnings and hours data are collected for most industry divisions, including mining; manufacturing; transportation (except railroads), communications and other public utilities; wholesale and retail trade; finance, insurance, and real estate; and services. Minor exceptions may be made.

Data Sources and Collection Methods

Data generally are obtained from employer payroll records, using one of two collection methods. Establishments may be solicited for information by mail or by personal visit. Those establishments contacted by mail receive a questionnaire form and a note requesting cooperation in the survey and explaining the nature and purpose of the study. Typically, the questionnaire requests information on the product or service of the establishment and number of employees, as well as other establishment information which may be pertinent to the survey. The respondent is requested to report each employee's earnings and weekly hours worked—the primary focus of the survey. Provision is made for the reporting of earnings on an hourly basis or on a salary or incentive basis. In the last two instances, the respondent reports the number of hours paid for during the salary or incentive period, thus permitting the computation of average hourly earnings for employees paid on other than an hourly basis.

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[1] The Bureau's studies conducted in this area before 1954 frequently related to selected occupations, or were limited to relatively narrowly defined industries.

[2] See technical references for a listing of publications containing full descriptions of both types or studies.

[3] See appendix B.

[4] See appendix C.

Certain large establishments, or companies from which data for several establishments are requested, are visited personally by the Bureau's field economists who may prepare the data for the survey from company records, or arrange with the company for the completion of the questionnaire form. In addition, a sample of establishments which do not reply to the mail questionnaire is visited by Bureau field economists to obtain the desired information.

To limit errors caused by incorrect reporting by the respondent, questionnaires received by mail are reviewed for reasonableness and consistency. Where data are questionable, a letter is written to the respondent asking him to review the item to assure its accuracy.

Sampling

Earnings and hours distribution studies are conducted on the basis of a sample of all establishments within the scope of the survey. The sample generally is derived from State Unemployment Insurance (UI) listings which show reporting units with four employees or more by location, number of employees, and industry classification. In industries where establishments with fewer than 4 employees are of numerical importance (e.g., retail trade) the UI lists may be augmented by sources such as other government agencies, or trade directories.

The size of the sample depends on several factors, among which are the size of the universe, the distribution of establishments by number of employees, the relative dispersion of earnings among establishments, the degree of accuracy required, and the cost of obtaining the data. Estimates of variance based on data from previous surveys also may be used in determining the appropriate size of the sample.

The sample usually is selected using a highly stratified probability sampling design. Establishments are first grouped, or stratified, according to industry, geographic location, and employment size. Establishments in specific industries or areas for which earnings and hours data are to be presented separately are grouped independently of establishments in other strata, and sampled separately.

In order to obtain maximum accuracy per unit cost, the number of establishments in the sample is distributed among the various strata in the most efficient manner, in accordance with the principles of optimum allocation. A fraction of establishments in each stratum is included in the sample, with the sampling fraction diminishing as the employment size of the strata decreases, so that the probability of inclusion in the sample is greater for the large than for the small establishment. Frequently the entire stratum containing the largest establishments is included in the sample.

The following example shows a hypothetical universe of 47 establishments in three employment-size groups. By applying the appropriate sampling ratio to each size group (stratum), the number of sample establishments is determined.

Employment size group	*Number of establishments in universe*	*Sampling ratio*	*Number of sample establishments*	*Weight of each sample establishment*
Under 25	32	1/4	8	4
25–49	12	1/3	4	3
50 and over	3	1/1	3	1

No assumption is made that the earnings and hours structures of establishments not responding to the mail questionnaire are similar to those of establishments which do respond.

Therefore, a sample is taken of the nonrespondents following a procedure similar to the one just described. Establishments in this subsample are visited by Bureau field representatives in order to obtain the required data.

Data are not always obtained for every establishment in the original sample. Generally, approximately 60 to 70 percent of the sample establishments supply usable data to the survey.

Estimating Procedure

Although a greater proportion of large than of small establishments is included in the sample, any possible bias which might result from this difference is avoided by means of the estimating procedure. Each establishment in the sample is assigned a weight which is the reciprocal of the sampling ratio in the stratum from which it was selected. That is, an establishment selected from a stratum in which a sampling ratio of 1 out of 4 is used is assigned a weight of 4, so that it represents itself and three other establishments in the stratum (see previous example). Data for each establishment are multiplied by the weight assigned to the establishment. Thus, all establishments, regardless of their size, are represented appropriately in the final estimates.

An establishment in the subsample of nonrespondents is weighted to represent all nonrespondents in the stratum. It is assigned a new weight— the product of the original weight and the inverse of the subsampling fraction. Thus, if a third were subsampled of a group originally sampled at the rate of 1 out of 2, the weight of 6 would be assigned. In the case of an establishment included in the sample with certainty, another establishment which is similar to the nonrespondent would be weighted to represent it.

In industry surveys, estimated employment totals derived from the weighting process are further adjusted to the employment levels for the payroll period studied, as reported in the Bureau of Labor Statistics monthly establishment employment series.[5] This adjustment is necessary to reduce the hazards of sampling, and because the State UI listings, which constitute the universe or a large part thereof, are prepared prior to the time of the survey and thus do not account for establishments opened or closed between the compilation of the lists and the date of the survey.

Estimated average hourly earnings or weekly hours of work are the arithmetic mean of weighted individual employees' earnings or hours. Generally, they are derived by totaling weighted individual hourly earnings or weekly hours and dividing the sum by the weighted number of employees in the group. However, in industries such as retail trade, in which hourly earnings frequently vary by weekly hours of work and in which the length of the workweek covers a broad range among employees, the most representative group average hourly earnings figure is considered to be the quotient of total individual weekly earnings divided by total individual weekly hours worked.

The following example illustrates the more common method of estimating group average hourly earnings. Referring to the sampling scheme described in the preceding example, assume that the eight sample establishments in the under 25 size group had 30 employees, each earning $1.50 an hour, 20 earning $2 and 15 earning $3, and that the 12 establishments in the 25–49 size group and the 3 in the 50- and over-size group had employees with earnings as shown. Making the calculations that follow, estimated group average hourly earnings are obtained.

Weight×	employment=	Weighted employment×	Hourly earnings=	Weighted group hourly earnings
4	30	120	$1.50	$180.00
	20	80	2.00	160.00
	15	60	3.00	180.00
3	50	150	1.50	225.00
	40	120	2.50	300.00
	30	90	3.00	270.00
1	150	150	2.00	300.00
	100	100	2.50	250.00
	50	50	3.00	150.00
		920		2,015.00

$$\text{Estimated group average hourly earnings} = \frac{\text{Total weighted group hourly earnings}}{\text{Total weighted group employment}} = \frac{\$2,015.00}{920} = \$2.19$$

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[5] See chapter 2, "Employment, Hours, and Earnings".

If the average is to be computed following the second procedure (such as would be done in retail trade studies), employment would be replaced by weekly hours in the example and the remainder of the calculations carried through. In this case, the ratio now shown in the example would be replaced by the ratio of total weekly earnings to total weekly hours.

Analysis and Presentation

The Bureau generally issues a bulletin on the results of each survey of employee earnings and hours distributions. The report contains a description and analysis of the survey results as well as tabulations of data collected.

In industry studies, tabulations are presented for the entire industry, and frequently they are also presented for important segments of the industry. For example, in a survey of manufacturing, in addition to data for the entire industry division, data also might be presented for most or all of the major groups (2-digit SIC codes) for several groups (3-digit SIC codes), and perhaps for some individual industries (4-digit SIC codes). In addition to nationwide presentation, data for all or some of the industry segments generally are shown separately on a regional basis, and frequently on a metropolitan-nonmetropolitan area basis.

In area studies, which include most industry divisions, data obtained are tabulated for all the industries in the area combined, and then separately for manufacturing and nonmanufacturing industries. Where sufficient data are available, tabulations are presented for selected industry groups as well.

Earnings are tabulated to show the distribution of employees by intervals of 5- and 10-cent average hourly earnings. Hours are tabulated to show the distribution of employees by weekly hours of work. The total number of employees, their average hourly earnings and average weekly hours, of course, also are shown. Data also may be presented to show average weekly earnings and cross-tabulations of average hourly earnings by weekly hours of work.

The text accompanying the tabulations gives a description of the area or industry studied and provides a summary and analysis of the survey results. Important relationships and differences among areas and industries are highlighted and, where data are available from earlier surveys, period-to-period changes in earnings and hours are discussed. In addition, a detailed description of the scope and method of survey is included in the report.

Uses and Limitations

The design of these employee earnings and hours distributions studies makes them particularly useful in the analysis of Federal minimum wage and maximum hours legislation —in analyzing the effects of legislation, in considering new legislation, and in formulating wage and hours policy. The information is used by the executive and legislative branches of government, organized labor, business, academicians, etc. Special tabulations are prepared for the U.S. Department of Labor's Employment Standards Administration, for use in the Secretary of Labor's annual report to the Congress required under section 4(d) of the Fair Labor Standards Act. In addition, the data are used in collective bargaining, wage setting, broad economic analysis of labor area and industry wage structures, comparisons of wage levels in various parts of the country, and to show trends in employment, earings, and hours.

Employment estimates are subject to some error, and in smaller groups this error may be relatively large. Therefore, these estimates frequently are provided to serve only as general guides to the size of the labor force included in the survey and as reference points from which to measure the direction and general magnitude of employment changes.

The average earnings reported are straight-time, and any premium pay for overtime or late shift work is not reflected. Similarly, differences in prevailing supplementary compensation practices ("fringe benefits") among establishments, industries, and areas are not considered.

BLS 3010b

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Office of Management
and Budget No. 44-S-71006
Approval expires 12-31-71

Report Number

Your report will be
held in confidence

Keep this copy for
your company file.

The data, except for Item 1 which relates to the entire company, should cover the establishment(s) in the location designated to the left.

SURVEY OF INDIVIDUAL HOURS AND EARNINGS OF NONSUPERVISORY EMPLOYEES

1. **ANNUAL GROSS SALES OR RECEIPTS FOR THE COMPANY, ENTERPRISE, OR INSTITUTION**

(Check appropriate box.)

(1) ☐ Under $250,000
(2) ☐ $250,000 to $1,000,000
(3) ☐ $1,000,000 or more

Check the box which indicates the annual gross volume of sales or receipts (exclusive of excise taxes) from all related activities of the company, enterprise or institution, including receipts from the establishment(s) covered by this report. Use the last calendar or fiscal year.

2. **ESTABLISHMENT INFORMATION:**

Please enter the information requested in the columns below for each separate establishment covered by this report. Each place of business, warehouse, or central office in a separate location is considered a separate establishment for the purpose of this survey.

(a) *Location:* Identify each establishment by its street address and city.

(b) *Type of Activity:* Describe the activity of each establishment listed, for example, gas station; drug store; department store; women's apparel store; shoe store; dime store; hotel; motel; dance hall; bowling alley; race track; amusement park; movie theatre; etc.

(c) *Employment:* Report all full-time, part-time, seasonal, and casual employees who received pay for any part of the payroll period including May 12, 1971. Include those paid for sick leave, holidays, vacations, etc. DO NOT INCLUDE proprietors, members of unincorporated firms, or unpaid family workers.
Total - Enter total number of employees. Include all classes of employees–executive, administrative and professional, as well as nonsupervisory employees.

Nonsupervisory - Enter number of workers below the supervisory level. Include employees such as *inside* salespersons, shipping and receiving clerks, routemen, laborers, warehousemen, repairmen, installers, room clerks, waiters and waitresses, nurses, office clerks, janitors, watchmen, etc. DO NOT INCLUDE driver salesmen, outside salesmen, executive, professional, and supervisory personnel.

(d) *Collective Bargaining:* Are a majority of nonsupervisory employees covered by union-management agreements? (Check appropriate column).

(e) *Annual Gross Sales or Receipts for the Establishment:* Check the column which indicates the annual gross volume of sales or receipts (exclusive of excise taxes).

(a) Location (street address and city)	(b) Type of Activity	(c) Employment for payroll period including May 12, 1971		(d) Union-management Agreement (Are majority covered?)		(e) Gross establishment sales (were last year's sales $250,000 or more?)		(f) For BLS Use Only	
		Total	Non-supervisory	Yes (1)	No (2)	Yes (1)	No (2)		
									1
									2
									3
									4
									5
									6
									7
									8
									9

(f) How many hours per day and days per week are the majority of your nonsupervisory employees scheduled to work?
Hours per day ☐ Days per week ☐

Enter hours to one decimal, e.g., 7.5

(g) After how many hours per day would your nonsupervisory employees receive overtime premium pay?
After ____ hours per day or ☐ we do not pay daily overtime.

Check here if you want a copy of the Bureau's report on this survey. ☐

Name and title of person furnishing data ______________________________
(Please Type or Print) Area code, Phone No.

Page 2

3. HOURS AND EARNINGS OF NONSUPERVISORY EMPLOYEES

Definitions and Instructions
(See also the examples below)

Hours worked and paid for and straight-time earnings of all nonsupervisory employees are requested for the payroll period (weekly, biweekly, semimonthly, or monthly) which includes May 12, 1971. Please report and identify the data separately for each of the locations listed in item 2(a).

- *Nonsupervisory Employees* are defined in item 2(c) on page 1 of this questionnaire. Remember to EXCLUDE *outside* salesmen, driver salesmen, executive, administrative, professional, and supervisory personnel.
- *Hours* should include all hours worked and hours paid for sick leave, holidays, vacations, etc. Also include the number of overtime hours actually worked.
- *Straight-time Earnings* should relate to the hours worked and paid for, including straight-time pay for overtime, holidays, weekends, and late shifts. Also include commission and bonus earnings. *Exclude*, however, all premium payments. (For example, if overtime is paid at time and one-half report only two-thirds of this pay).
- *These data are requested separately for each nonsupervisory employee.* However, one entry may be made if two or more employees worked *identical hours* and received *identical straight-time pay* (see example A below). To avoid correspondence, please *do not report* aggregate hours and earnings for several employees.
- Detailed instructions and examples for reporting the necessary data in each column are listed below.

ALL NONSUPERVISORY EMPLOYEES, COMPLETE COLUMNS (2) and (3)	*Column (2)* - Use a separate line for each employee and enter "1," unless two or more employees worked the same number of hours and received *identical hourly or salary rates* (see example A). Please check to see that the sum of the employees in this column equals the number of nonsupervisory employees reported in item 2(c) on page 1. *Column (3)* - Enter the number of hours paid for during the week of May 9-15, 1971 regardless of the length of the payroll period. Include hours paid for sick leave, holidays, vacations, etc. Count the number of overtime hours actually worked. (Not hours "boosted" to reflect premium pay.)
EMPLOYEES FOR WHOM STRAIGHT-TIME HOURLY EARNINGS ARE AVAILABLE, USE COLUMN (4)	*Column (4)* - Enter the average straight-time hourly earnings. Exclude premium payments for overtime and for weekend, holiday, and late shift work. (You should use this column to report earnings of employees even when paid on a salary basis *if* average straight-time hourly earnings are available). If the hourly earnings exclude commissions or bonuses, also complete columns 7 and 8 (see example D).
EMPLOYEES PAID ON A SALARY BASIS (IF HOURLY EARNINGS ARE NOT AVAILABLE), USE COLUMNS (5) and (6)	*Column (5)* - Enter the straight-time salary for the salary period (weekly, biweekly, semimonthly or monthly) which includes May 12, 1971. Include straight-time pay for overtime but exclude overtime premium. Do not include "draws" against commission as salary. For employees paid a commission or bonus in addition to a salary, also complete columns 7 and 8 (see example E). *Column (6)* - Enter the number of hours paid for during the payroll period for which earnings were reported in column 5 to permit accurate calculation of average straight-time hourly earnings.
EMPLOYEES RECEIVING COMMISSION AND/OR BONUS PAY, USE COLUMNS (7) and (8)	*Column (7)* - Enter for *each* employee the total commission and/or bonus pay, including "PM's," "Stims," or any special bonuses based on sales paid quarterly or oftener. This pay is to be reported for the commission or bonus period including May 12, 1971. If the commissions earned during that pay period are not representative of normal commission earnings, a longer period may be used. If employees receive both commission and bonus payments for an identical period of time, report the combined figure (see example D). If bonus payments cover a period longer than the commission period, add only the prorated amount of the bonus to the commission earnings that correspond to the commission period (see example E). *Column (8)* - Enter the number of hours worked during the commission or bonus period. (The hours should refer to the total hours worked during the period and not necessarily only to those hours during which commissions or bonuses were earned.) For employees paid an hourly rate or salary in addition to commissions or bonuses, it is also necessary to complete column 4, or columns 5 and 6 (see examples D and E).

EXAMPLES
(See illustrations on next page)

A. Two employees each worked 36 3/4 hours during the survey week and each was paid a straight-time hourly rate of $2.20.

B. One employee, who worked 40.0 hours during the survey week, received a salary of $168.50 (exclusive of any premium pay) for 88.0 hours worked during the salary period (½ month).

C. One employee, who worked 32.5 hours during the survey week, was paid on a straight commission basis and received $361.20 for 168 hours worked during the commission period (1 month).

D. One employee, who worked 40.0 hours during the survey week, was paid a straight-time hourly rate of $1.95 and also received $35.00 in commissions and $7.50 in "PM's" for 173.6 hours worked during the commission period (1 month).

E. One employee, who worked 37.5 hours during the survey week, was paid a weekly salary of $75.00, received commissions of $102.00 for 162.0 hours worked during a 1-month period, and $150.00 in bonuses earned during a 3-month period. Only 1/3 of the bonus ($50.00) is reported so that the bonus period corresponds to the commission period.

3. HOURS AND EARNINGS OF NONSUPERVISORY EMPLOYEES

page 3

Line No. (1)	Complete these columns for all nonsupervisory employees		Use this column if hourly earnings are available	Use these columns for nonsupervisory employees paid other than on an hourly basis.			
				Salary		Commissions and/or Bonus	
	Number of employees (2)	Hours paid for during the week of May 9-15, 1971 (Nearest tenth) (3)	Straight-time hourly earnings (Nearest cent) (4)	Straight-time salary for salary period including May 12, 1971 (Nearest cent) (5)	Hours paid for during salary period (Nearest tenth) (6)	Total commissions and/or bonus pay (Nearest cent) (7)	Hours paid for during commission period (Nearest tenth) (8)
Illustrations of examples on page 2.							
A.	2	36.8	$ 2.20	$		$	
B.	1	40.0		168.50	88.0		
C.	1	32.5				361.20	168.0
D.	1	40.0	1.95			42.50	173.6
E.	1	37.5		75.00	37.5	152.00	162.0
DATA FOR EACH ESTABLISHMENT SHOULD BE REPORTED SEPARATELY AND THE ESTABLISHMENT IDENTIFIED.							
01							
02							
03							
04							
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33							
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35							
36							

3. HOURS AND EARNINGS OF NONSUPERVISORY EMPLOYEES

page 4

Line No.	Complete these columns for all nonsupervisory employees		Use this column if hourly earnings are available	Use these columns for nonsupervisory employees paid other than on an hourly basis.			
				Salary		Commissions and/or Bonus	
	Number of employees	Hours paid for during the week of May 12-15, 1971 *(Nearest tenth)*	Straight-time hourly earnings *(Nearest cent)*	Straight-time salary for salary period including May 12, 1971 *(Nearest cent)*	Hours paid for during salary period *(Nearest tenth)*	Total commissions and/or bonus pay *(Nearest cent)*	Hours paid for during commission period *(Nearest tenth)*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
01			$	$		$	
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
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Technical References

Number

1. U.S. Department of Labor, Bureau of Labor Statistics: *Employee Earnings and Hours in Eight Metropolitan Areas of the South, June 1965* (Bulletin 1533, 1966).
2. ———. *Employee Earnings and Hours in Retail Trade, June 1966* (Bulletin 1584, 1968).
3. ———. *Earnings in Wholesale Trade, June 1958*, (Bulletin 1253, 1959).
4. ———. *Factory Workers' Earnings, May 1958* (Bulletin 1252, 1959).
5. ———. *Employee Earnings in Nonmetropolitan Areas of the South and North Central Regions, June 1962* (Bulletin 1416, 1964).
6. ———. *Employee Earnings in Retail Trade, June 1962* (Bulletin 1380, 1963).

Each of these bulletins contains a detailed description of the method used in the survey.

—ALVIN BAUMAN

Chapter 16. Union Wage Rates

Background and Description of Survey

Annual studies of union wage rates and hours are conducted in four industries: building construction, local transit, local trucking, and printing.[1] Union wage rates and hours are those agreed on through collective bargaining between employers and trade unions; they are defined as (1) the basic (minimum) wage rates (excluding holiday, vacation, or other benefit payments regularly made or credited to the worker each pay period) and (2) the maximum number of hours per week at straight-time rates. Rates in excess of the negotiated minimum, which may be paid for special qualifications or other reasons, are excluded.

The use of union agreements or other union records in studies of occupational wages is practicable in industries that are characterized by a high degree of organization and in which (1) defined craft groupings persist, as in building construction or printing, or (2) key occupations can be clearly delineated, as in local transit.

The Bureau's annual union wage studies began in 1907. Originally, information was obtained for 39 cities, but the number was expanded gradually until in 1948, 82 cities were covered.[2] That number was reduced to 77 in 1949 and to 52 in 1953. The studies were expanded again, after the 1960 Census of Population, to the present coverage of 68 cities having 100,000 inhabitants or more. The scope of the information for individual industries has also been expanded. For example, 24 journeymen crafts and nine helper and laborer classifications in the building trades are covered currently, in place of the 13 journeymen and 7 helper and laborer classifications in the initial studies.

The study of union wage rates and hours in the building trades includes virtually all journeymen and helper and laborer classifications. Indexes and other data are shown for each important trade as well as for all trades combined.[3]

The trucking study embraces drivers and helpers engaged in local trucking. Over-the-road drivers and local city drivers paid on a mileage or commission basis are excluded. All data, including indexes, are presented for the two classifications indicated.

Union wages and hours in the local-transit industry are limited to operating employees. Data are shown separately for operators of surface cars and buses, and elevated and subway lines, except that indexes are shown only for the industry as a whole.

In the printing industry, 12 book and job trades, 8 newspaper trades and 6 lithography trades are studied, and for the newspaper trades, separate data are shown for day and nightwork. Indexes and other data are presented separately, by type of printing, (except lithography) for each trade and for all trades combined.

Data Sources and Collection Methods

The union wage studies are designed to include all local unions in the covered industries in the selected cities. Periodic checks are made with central labor unions, district councils, and other authoritative bodies to identify new local unions that should be included in the studies.

Information is collected by mail from local unions and when necessary from international unions and regional union organizations. Personal visits are made to unions that do not respond to the mail questionnaire. Before 1947, all data relative to union wage studies were collected directly from local union officials (generally the secretaries or business agents) by Bureau representatives and entered on forms designed specifically for this purpose.

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[1] The coverage at various times also included barbers, linemen, longshoremen, and workers engaged in breweries, laundries, metal trades, millwork, restaurants, soft-drink production, theaters, and bakeries. The Bureau plans to conduct the first in a series of biennial studies of union wage rates for grocery store employees in July 1971.

[2] In these studies, data relate to individual cities and contiguous suburban areas, rather than to the much broader Standard Metropolitan Statistical Areas which are used in most other Bureau surveys.

[3] In addition to the annual studies in the building trades, a quarterly survey of 7 major construction trades is conducted in 104 cities. Estimated average hourly wage rates for all trades combined and for each surveyed trade are presented, together with the estimated change during the quarter and the year.

Information requested relates to July 1 for all industries. This date was adopted, after numerous changes, because most new agreements in these industries have been negotiated by that time each year. In order to maintain year-to-year comparability, wage rate, hours, and membership data for the previous year are transcribed onto the forms before they are sent out. Union officials are requested to check the previous year's data and revise any figures which may have been incorrectly reported, and to insert current data. Copies of union agreements also are requested from union officials for the purpose of (1) checking the data entered on the schedules with the terms of the agreements, and (2) building up the files of union agreements maintained by the Bureau of Labor Statistics.[4] The reporting form used for the building trades survey is reproduced on pages 149–151.

Sampling and Estimating Procedures

The current series is designed to reflect union wage rates and hours in all cities of 100,000 inhabitants or more, excluding Honolulu. All cities of 500,000 inhabitants or more are included, as are most cities in the 250,000 to 500,000 group. The cities in the 100,000 to 250,000 group selected for study are distributed widely throughout the United States. Data for some of the cities included in the study are weighted to compensate for cities not surveyed. To provide appropriate representation in the combination of data, each region is considered separately when city weights are assigned.[5]

Rates

An over-all average hourly rate is computed for each of the industries included in the union wage studies. In addition, averages are presented by industry branch, trade, city, and region in building construction and printing; and by city and region, in local transit and local trucking.

Average union rates are calculated by weighting each quotation for the current year by the reported membership.[6] These averages are levels designed to provide comparisons among trades and cities at a given time. They do not measure the trend of union rates, the function served by the index series.

Indexes

Chain indexes are calculated for each of the four industries to portray the trend of union wage rates and weekly hours. In calculating these indexes, the percent change in aggregates is computed from quotations for all identical classifications in the industry for 2 successive years. To obtain the aggregates, the rates and hours for both the previous and current years are weighted by the membership in the particular classification for the current year. The index for the current year is computed by multiplying the index for the preceding year by the ratio of the aggregate change. In the 1970 study of building trades, the rate aggregate for all quotations increased 11.6 percent over the previous year. The July 1, 1970, index of union hourly wage rates for all building trades (128.8) is the result of multiplying the July 1, 1969, index (115.4) by the ratio of the aggregates (111.6). This method of index calculation minimizes the influence of year-to-year changes in membership.

Indexes of union hourly wage rates and weekly hours are computed for each classification as well as for all classifications combined in the building construction and printing industries. In the local trucking and local transit industries, indexes are provided only for all classifications combined. Irregular hours of work for operating employees in many of the covered cities prevent the computation of an index for union weekly hours in the local transit industry.

The base period for the indexes of union wage rates and weekly hours is the 1967 average. The series for the building trades and printing industry date back to 1907, for local

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[4] See chapter 20, "Collective Bargaining Agreements."

[5] The cities in the sample were not selected on a probability basis. Continuity of city data has taken precedence over sampling procedure during periods of contraction and expansion in the program.

[6] Reported membership, as used in this study, is defined as members working or immediately available for work.

BLS 1150.1
(Rev. 1971)

Budget Bureau No. 44-R738.12.
Approval expires 3-31-72.

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

Dear Sir:

The Bureau of Labor Statistics is now conducting its annual survey of union wage scales and hours in the building trades. The continued success of these surveys, begun in 1907, depends largely upon your cooperation and we are asking that you furnish information requested on this schedule form. The completed form should be signed and returned to the Bureau in the enclosed self-addressed envelope which requires no postage. We would appreciate your returning the completed form promptly.

Thank you very much for your cooperation.

Very truly yours,

Regional Director.

INSTRUCTIONS FOR COMPLETING THIS FORM

Part A: Answer general information questions in this part of schedule.

Part B: Check and revise, if necessary, information reported for July 1, 1970. If any of your trade classifications have been omitted, insert them and the negotiated scales in the appropriate columns. Should you have more than one negotiated scale for a trade or classification, report separate information for each scale. For each trade or occupation group shown in column (2), enter in column (5) the wage scale in effect on July 1, 1971, and in column (10), the number of weekly hours before overtime rate is effective. The number of union members at each scale should be entered in column (15), and the number of apprentices, as of July 1, 1971, should be entered in column (17) for each trade.

Copy of Agreement: Please provide a copy of each of your agreements to assist us in our analysis of collective bargaining provisions. If you have only one copy avaiblale, we shall be glad to make a duplicate and return the original promptly. If requested, the agreement will be kept in confidence and material used only for general analysis which will not reveal the name of either party to the agreement.

UNION SCALES OF WAGES AND HOURS IN THE BUILDING TRADES
(Annual Survey)

PART A.–GENERAL INFORMATION:

Please attach a copy of your agreement in effect on July 1, 1971, and answer the following questions:

1. When did your agreement go into effect?________________________

   When may it be reopened?________________ When does it expire?________________

2. What is the maximum number of hours that can be worked each day before overtime rate is effective?____________
3. Does your agreement provide for a health and insurance plan (life insurance, hospitalization, medical, surgical, and other similar types of health and welfare programs) financed–

   Entirely by employer? ☐ Yes ☐ No In part by employer? ☐ Yes ☐ No

   Amount of employer contribution ____________ (cents or percent) per Hour ☐ Shift ☐ Week ☐ Month ☐

4. Does your agreement provide for a pension plan financed–

   Entirely by employer? ☐ Yes ☐ No In part by employer? ☐ Yes ☐ No

   Amount of employer contribution ____________ (cents of percent) per Hour ☐ Shift ☐ Week ☐ Month ☐

5. Does your agreement specifically provide for a paid vacition, financed by employer payments–

   (A) To a vacation fund ☐ Yes ☐ No

   FUND PAYMENTS DEDUCTED FROM PAYROLL UPON WRITTEN, IMPLIED, OR CONTRACTURAL AUTHORIZATION OF WORKERS ARE NOT CONSIDERED EMPLOYER PAYMENTS

   (B) To worker each pay period, as part of negotiated scale ☐ Yes ☐ No

   (C) To worker each pay period, in addition to negotiated scale ☐ Yes ☐ No

   (D) Other–(Explain)________________________

If answer is Yes to any of above, indicate amount of employer payment ________________ (cents or percent) per hour.

6. Does your agreement provide for employer payments to other funds, such as holiday, educational, promotional, unemployment benefits? ☐ Yes ☐ No If YES, list below each type of contribution separately and amount of employer payments (cents or percent).

   ____

   ____

7. What is the total membership of your union?__________ How many are journeymen?__________ How many are apprentices?__________ How many are helpers and laborers?__________
8. Between July 1, 1970, and July 1, 1971, how many apprentices completed their apprenticeship?

   (If none enter zero.)__________

9. Between July 1, 1970, and July 1, 1971, how many journeymen became unavailable for work because of death, permanent disability, or retirement? (If none enter zero.)________________

Please sign your name here________________ Title__________ Date__________, 1971.

Address____________________ City, State, and ZIP Code________________

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

Union Scales of Wages and Hours in the Building Trades (Annual Survey)

Part B. Scale and membership information by trade:

Please enter the data requested below. Do not use columns marked 'Code.'

Employer payments to insurance, pension, vacation, or other funds should be excluded from the hourly scales below, and shown as cents or percent of scale in the spaces provided in part A.

Payments specifically designated as being in the negotiated wage scale for any benefit should be excluded from hourly scales reported below even though they are made or credited to the worker each pay period.

Membership information will be kept in confidence and used only to compute average wage rates.

☐☐☐☐☐☐☐☐☐ Schedule No.____ Page____of____

Trade or occupation		Wage scale for each trade or occupation in effect on July 1—					Weekly hours before overtime rate is effective on July 1—					Number of union members working or immediately available for work at each rate on July 1—			Number of apprentices in each trade on July 1—		
(1) Code	(2) Title	(3) 1969	(4) 1970	(5) 1971	(6) Code	(7) Code	(8) 1969	(9) 1970	(10) 1971	(11) Code	(12) Code	(13) 1969	(14) 1970	(15) 1971	(16) 1970	(17) 1971	(18) Code

transit to 1929, and for local trucking to 1936. Although data for the latter two industries were collected for years before the dates of the index series, indexes were not constructed because of inadequacies in the available data.

Analysis and Presentation

The averages and indexes mentioned together with other summary data are contained in the bulletins published annually for the individual studies. Included among the information shown for individual trade classifications is the proportion of union members having hourly rates at different levels, as well as the proportion of union members having, since the previous study, wage rate increases of specified amounts in terms of cents per hour and percent. The increase registered by the trade is shown also.

In addition, the union rates of wages and hours in effect on the date of the survey, as reported by union officials, for both the previous and current years are published for each classification by city. These furnish a direct comparison of union rates between the 2 years for each of the industries studied. The rates of wages are indicated as hourly rates and the hours as the weekly hours of work before overtime rates are applicable. The current studies also present data on employer payments for insurance (health and welfare) and pension payments; in addition employer payments for vacation and other funds (except those for apprenticeship) are shown for the building trades. These payments are expressed in terms of cents per hour or as percent of rate.

Uses and Limitations

The Bureau's union-wage series provide a means of determining intercity wage differences for comparable work, and the relationships between rates applicable to workers in occupations requiring varying degrees of skill. The data are used in wage negotiations by both management and labor. The wage rates of building-trades workers are especially important in estimating construction costs, because labor expenditures constitute an important element in the total cost of building construction. The index series derived from these studies provide barometers of year-to-year changes in rates of wages and hours in the industries covered.

Average union rates provide comparisons of wage rates among industries, trades, and cities at a given time. Unlike the indexes, they are not an accurate measurement of year-to-year changes because of fluctuations in membership and other factors. Membership figures for the various trades or classifications do not remain constant and changes may have a marked effect on average rates. For example, if organizational drives in cities having relatively lower rates of wages result in sharp increases in membership, the movement of the rate levels for the affected trades as a whole is naturally retarded. Conversely, increases in membership in cities having high wage rates accelerate the upward movement of averages.[7]

The union rates, are not necessarily the actual rates paid to all workers, and the union hours are not necessarily the hours actually worked. Workers with above average experience and skill may be employed at rates above the union wage rates, especially during prosperous times when a tight job market creates competitive bidding for the better workmen. During periods of depressed business activity, actual hours worked often are less than hours specified in the union agreement.

—THOMAS C. MOBLEY

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[7] Membership (used for weighting purposes) relates only to active members in the city and contiguous suburban areas. It does not reflect the total jurisdiction of local unions, which may extend beyond these limits, and it does not necessarily reflect metropolitan area rates.

Chapter 17. Current Wage Developments

Background

Since January 1948, the Bureau of Labor Statistics has issued a monthly report listing general wage changes and changes in supplementary benefits agreed to in selected collective bargaining situations, identifying the situations by company and union name. The scope of the listing has varied somewhat from time to time, but since 1953, it has been limited to agreements affecting approximately 1,000 or more production and related workers in manufacturing and selected nonmanufacturing industries.

Current Wage Developments was initiated because of the rapid increase in wage rates and prices in the early post World War II period, the interest in determining the extent to which settlement patterns spread from industry to industry, and the discontinuance of an index of wage rates that had been initiated during World War II. Interest in the listing was stimulated by the Korean emergency when the Wage Stabilization Board needed data on the extent to which wages and benefits were being changed.

In 1949, and again in 1951 and 1952, statistical summaries of wage changes were prepared to supplement the listing, but regular preparation of a statistical summary began in 1954. These quarterly statistical summaries show the distribution of settlements and (since 1955) of workers by the size of the general wage changes agreed to and the frequency with which various types of supplementary benefits were introduced or changed.

Beginning in 1959, another statistical summary was instituted. It is limited to manufacturing, but includes information on general wage changes for nonunion and small union situations, as well as for large collective bargaining situations.[1] From 1959 through 1970, this summary also included information on changes in supplementary benefits.

Description of Series

The summary of major collective bargaining situations hereafter is referred to as the "major" series, and the summary that is based on changes in wages in manufacturing firms of all kinds is described as the "manufacturing" series.

The major series describes general wage changes and changes in benefits[2] in all collective bargaining settlements involving 1,000 or more production and related workers in manufacturing and 1,000 or more nonsupervisory workers in the nonmanufacturing sector, excluding Government.[3]

Supervisory or professional employees are excluded. Large units of technicians are included even though they are part of a bargaining unit that is predominantly professional.

Contracts covering multiplant firms are included if the agreement as a whole covers 1,000 or more workers even though each individual plant employs fewer. Also included are contracts with trade associations or with groups of firms that bargain jointly with a union or unions, even though the firms are not associated formally and each has fewer than the minimum number of workers covered by the series. Situations in which two or more unions, together representing more than 1,000 workers but individually accounting for fewer, negotiate essentially identical contracts with one firm or a group of firms, are tabulated as one bargaining unit.

The summary for manufacturing as a whole represents all establishments with four or more employees that adjust wages by means of general wage changes,[4] regardless of whether the workers are represented by a union.

Wage change data are presented in cents per hour and, since 1959, as a percentage of average straight-time hourly earnings, adjusted to exclude premium pay for overtime work.

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[1] The listing, as contrasted with these summaries, provides a much more detailed account of negotiated wage and benefit changes than can be presented in a tabular summary. When available, information on changes for large groups of nonunion workers, including professional, white-collar, and production employees, also is presented.

[2] Only changes in benefits that represent changes in costs are included.

[3] Prior to 1966, the construction service trades and finance industries are also excluded.

[4] General wage changes are defined as changes affecting at least one-tenth of the workers at any one time or all workers in an occupation. Changes resulting from promotions, merit increases, etc., are excluded.

Two types of information are presented on wage changes: (1) information on changes that go into effect within 12 months of the date on which they are decided or negotiated, thus reflecting the economic climate at the time the changes are decided upon; and (2) all changes effective during the period being summarized whether or not they were (a) decided upon during that period, (b) were deferred—that is, decided upon earlier—or (c) resulted from operation of cost-of-living clauses. In distributions of workers by size of wage change, all workers in an establishment or collective bargaining situation are distributed according to the average wage increase in the establishment or situation. The number of workers affected by changes in supplementary benefits includes all production and related workers in the situations where the benefit is changed, whether or not all are affected immediately. For example, if a fourth week of vacation is added for workers with 20 years' service in an establishment employing 1,000 workers, a vacation change would be recorded for 1,000 workers, even though only a relatively small proportion would benefit from the change immediately.

Data Sources and Collection Methods

The statistical summary of the major series is compiled from the summaries of collective bargaining settlements presented in the monthly *Current Wage Developments* listing which, in turn, is derived primarily from secondary sources, including general circulation newspapers and periodicals, as well as union, management, and trade publications. Other important sources of information are the file of union contracts maintained by the BLS and the U.S. Department of Labor's files of pension and health and welfare agreements, maintained by the Office of Labor-Management and Welfare-Pension Reports.[5] By the end of the year, the BLS contacts, almost entirely by mail, either management or labor representatives in any situation for which these other sources have not yielded information on wage and benefit changes during the year.

Information for nonunion and small unionized firms is gathered quarterly (semiannually in 1965 and 1966) by a questionnaire mailed to participating establishments. The information on general wage changes is supplemented by the contract file (unionized establishments) and from newspaper clippings, purchased from a commercial clipping service. At the end of the year, BLS field representatives contact, primarily by telephone, a sample of firms that have failed to respond to the mail questionnaire or that have provided incomplete or unclear information.

Sampling and Estimating Procedures

As indicated earlier, all bargaining situations with 1,000 or more workers in manufacturing and nonmanufacturing industries are included in the major series. It is believed that the current list of nearly 2,500 such situations, built up since *Current Wage Developments* was started in 1948, is very nearly complete. After a bargaining situation is added to the universe, it is withdrawn only if it ceases to be within the scope of the survey (e.g., because of a change in business to one outside the scope of the survey, a change to nonunion from union, or because of an apparently permanent drop in employment to substantially below 1,000).

The sample for manufacturing is derived from State unemployment insurance listings (UI) which show reporting units with four or more employees by location, number of employees, and industry classification.[6] The sample is a highly stratified probability design, with sampling ratios varying from 1 out of 150 establishments with 4 to 19 employees to all of those with 1,000 or more employees.[7]

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[5] Information from contracts supplied on a confidential basis is used only in the statistical summaries, not for the monthly listing.

[6] See appendix B, "Industrial Classification." For a more detailed description of unemployment insurance data, see p. 15, chapter 2.

[7] In the case of a few companies with large numbers of establishments each with 1,000 workers or more, a sample of plants is chosen.

BLS 2675d

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Office of Management and
Budget No. 44-R1135
Approval expires 3/31/72

Wage Developments in Manufacturing, 1971

The Bureau of Labor Statistics will hold all information furnished by the respondent in strict confidence.

(Change if incorrect, include ZIP code.)

← Identification or location of establishment for which information is requested, if different from mailing address.

I. What was the major product (in terms of sales value) of this plant during 1970? ______

II. Please provide employment and payroll information for the payroll period including January 12, 1971.

See page 4 for explanation.

A. All employees	B. All production and related workers		
1. Number	1. Number	2. Payroll	3. Man-hours
☐	☐	$	☐

III. Do collective bargaining agreements cover a majority of your production and related workers? Yes ☐ No ☐

If "No," please skip to section VII. →
If "Yes," please answer all questions except X.

FOR UNION FIRMS ONLY

IV. Union and Agreement Identification:

A. With what union or unions do you have a collective bargaining agreement? ______

B. Are you a party to an agreement signed by an employer association with this union(s)? Yes ☐ No ☐
If so, what is the association's name? ______

V. Agreement Expiration Date:

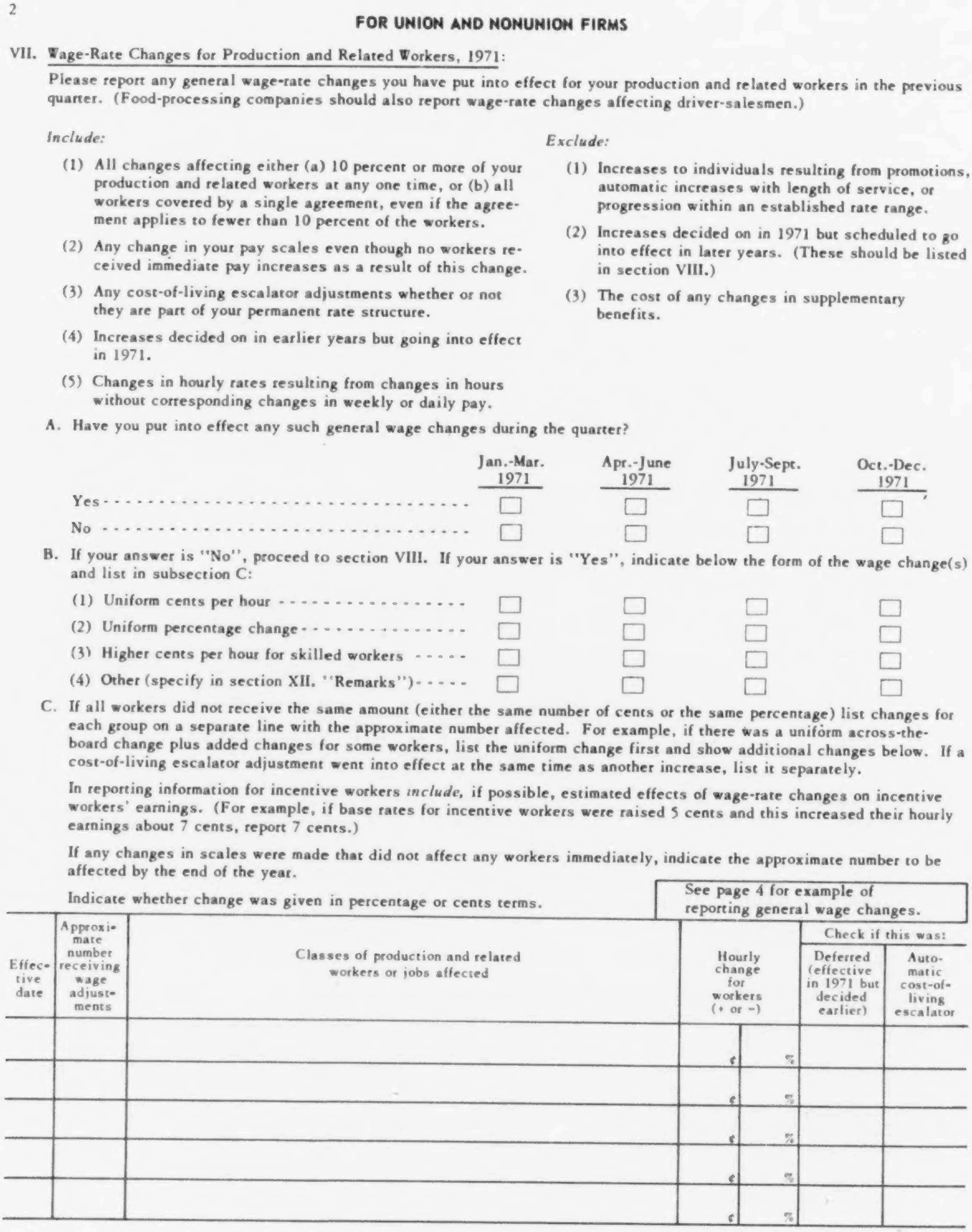
When does your collective bargaining agreement(s) expire or become subject to reopening on wages?

______ ______
(Space has been provided for two entries since the date may change during the year.)

VI. New or Revised Agreement: Please mark appropriate boxes below to bring your report up to date for—

During the quarter—	Jan.–Mar. 1971		Apr.–June 1971		July–Sept. 1971		Oct.–Dec. 1971	
	Yes	No	Yes	No	Yes	No	Yes	No
A. Did you negotiate a new or revised collective bargaining contract(s) for your production and related workers?	☐	☐	☐	☐	☐	☐	☐	☐
B. Did you agree on an immediate or deferred change in wages?	☐	☐	☐	☐	☐	☐	☐	☐

PLEASE TURN TO NEXT PAGE.



2

FOR UNION AND NONUNION FIRMS

VII. Wage-Rate Changes for Production and Related Workers, 1971:

Please report any general wage-rate changes you have put into effect for your production and related workers in the previous quarter. (Food-processing companies should also report wage-rate changes affecting driver-salesmen.)

Include:

(1) All changes affecting either (a) 10 percent or more of your production and related workers at any one time, or (b) all workers covered by a single agreement, even if the agreement applies to fewer than 10 percent of the workers.

(2) Any change in your pay scales even though no workers received immediate pay increases as a result of this change.

(3) Any cost-of-living escalator adjustments whether or not they are part of your permanent rate structure.

(4) Increases decided on in earlier years but going into effect in 1971.

(5) Changes in hourly rates resulting from changes in hours without corresponding changes in weekly or daily pay.

Exclude:

(1) Increases to individuals resulting from promotions, automatic increases with length of service, or progression within an established rate range.

(2) Increases decided on in 1971 but scheduled to go into effect in later years. (These should be listed in section VIII.)

(3) The cost of any changes in supplementary benefits.

A. Have you put into effect any such general wage changes during the quarter?

	Jan.-Mar. 1971	Apr.-June 1971	July-Sept. 1971	Oct.-Dec. 1971
Yes	☐	☐	☐	☐
No	☐	☐	☐	☐

B. If your answer is "No", proceed to section VIII. If your answer is "Yes", indicate below the form of the wage change(s) and list in subsection C:

(1) Uniform cents per hour	☐	☐	☐	☐
(2) Uniform percentage change	☐	☐	☐	☐
(3) Higher cents per hour for skilled workers	☐	☐	☐	☐
(4) Other (specify in section XII. "Remarks")	☐	☐	☐	☐

C. If all workers did not receive the same amount (either the same number of cents or the same percentage) list changes for each group on a separate line with the approximate number affected. For example, if there was a uniform across-the-board change plus added changes for some workers, list the uniform change first and show additional changes below. If a cost-of-living escalator adjustment went into effect at the same time as another increase, list it separately.

In reporting information for incentive workers *include,* if possible, estimated effects of wage-rate changes on incentive workers' earnings. (For example, if base rates for incentive workers were raised 5 cents and this increased their hourly earnings about 7 cents, report 7 cents.)

If any changes in scales were made that did not affect any workers immediately, indicate the approximate number to be affected by the end of the year.

Indicate whether change was given in percentage or cents terms.

See page 4 for example of reporting general wage changes.

Effective date	Approximate number receiving wage adjustments	Classes of production and related workers or jobs affected	Hourly change for workers (+ or −)		Check if this was: Deferred (effective in 1971 but decided earlier)	Automatic cost-of-living escalator
			¢	%		
			¢	%		
			¢	%		
			¢	%		
			¢	%		

VIII. Future Wage-Rate Changes:

List any general wage-rate changes already decided upon for your production and related workers but scheduled to go into effect in the future.

Effective date (month, date, and year)	Workers affected		Amount of change for workers whose rates will be changed	
	Estimated Number	Classes or jobs		
			¢	%
			¢	%
			¢	%
			¢	%

IX. Cost-of-Living Escalation:

Do you have a cost-of-living escalator policy whereby wages are changed automatically with specified changes in a price index? Yes ☐ No ☐ If so, please list the months in which wage changes will go into effect if the price index warrants. ____________________

FOR NONUNION FIRMS ONLY

X. Policy Regarding Wage Changes:

Whether or not you changed wages during the first quarter of 1971, what is your policy regarding general wage changes?

1. Wages are normally changed only on an individual basis. ☐
2. General wage changes are sometimes made. ☐

XI. Do you want a copy of the Bureau's summary on this survey? - - - - - - - - - - - - Yes ☐ No ☐

XII. Remarks:

Name and title of person furnishing data ____________________ (Please Type or Print) ____________ Area code, Phone No.

Explanations for Report on Wage Developments in Manufacturing, 1971

Section II-A All employees—total number on the payroll of the plant covered by this report who worked full-time or part-time or received pay for any part of the period reported. Include persons on paid vacations and sick leave. Exclude persons on leave without company pay the entire period as well as pensioners and members of the Armed Forces not working during the period reported.

Section II-B Production and related workers. *Include* working foremen and all nonsupervisory workers engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packaging, warehousing, shipping, trucking, hauling, maintenance, repair, janitorial, watchmen services, product development, auxiliary production for plant's own use (e.g., power-plant), recordkeeping, and other services closely associated with these production operations.

Exclude employees engaged in executive, purchasing, finance, accounting, personnel, cafeteria, professional, and technical activities; sales, advertising; collection; installation, and servicing of products; route office functions; factory supervision above the working foremen level; and employees on your payroll engaged in construction of major additions or alterations to the plant.

Number. Include both full-time and part-time production and related workers on your payroll—whether wage or salaried—who worked during or received pay for any part of the payroll period reported. Include persons on paid sick leave, paid holidays, and paid vacations.

Payroll. Include pay earned during the payroll period by production and related workers reported in the preceding box. Payroll should be reported before deduction for old-age and unemployment insurance, group insurance, withholding tax, bonds, and union dues. Include cost-of-living allowances, pay for overtime, holidays, vacations, and sick leave.

Man-hours. Include all hours worked, not scheduled hours, during the payroll period by the production and related workers reported in the first box plus hours paid for stand-by or reporting time and holidays, and man-hours equivalent to pay received by employee directly from your firm for sick leave and for holidays and vacations for this payroll period.

Section VII-C Each period report the general wage-rate changes you have put into effect for your production and related workers since your previous report to us. (Note: Establishments in the food-processing industries should also report wage-rate changes for driver-salesmen.) Entries of various types of wage changes can be illustrated as follows:

Effective date	Approximate number receiving wage adjustments	Classes of production and related workers or jobs affected	Hourly change for workers (+ or -)		Check if this was:	
					Deferred (effective in 1971 but decided earlier)	Automatic cost-of-living escalator
1/5	1,000	All	+ 8 ¢	%		
1/5	950	All except common labor	Avg. 3 ¢	+ ½ to 5 %		
2/10	1,000	All	+ 2 ¢	%	X	
6/15	1,000	All	4¢ – 8 ¢ Avg. 6 ¢	%		
6/15	100	Maintenance	+ 9 add. ¢	%		
8/5	400	Time	+ 6 ¢	%		
8/5	600	Incentive	+ 7 ¢	%		
10/1	1,000	All	- 1 ¢	%		X
12/5	125	Powerplant and maintenance	+ 10 ¢	%		

The ratios are uniform for all industries. Since data are available from secondary sources for all unionized situations with at least 1,000 production and related workers, data for all establishments meeting this criteria also are included in the summary for manufacturing. The sample selected from the UI listings is compared with this list of establishments for which information already is available; since data for these sample members are obtained from secondary sources, these establishments are not sent questionnaires. Approximately 6,000 establishments are left for the questionnaire survey.

Although the sampling design yields a sample in which large firms are relatively overrepresented, this bias is overcome by the estimating procedure. Each establishment in the sample is assigned a weight which is the reciprocal of the sampling ratio in the stratum from which it was selected. An establishment selected from a stratum from which 1 out of 4 establishments is chosen is assigned a weight of 4, so that it represents itself and three other establishments. Information for each establishment is multiplied by the weight assigned to the establishment. Thus, all establishments, regardless of size, are represented appropriately in the final estimates.

An establishment in the subsample of nonrespondents followed up by a visit is weighted to represent all nonrespondents in the stratum. It is assigned a new weight—the product of the original weight and the inverse of the subsampling fraction. Thus, 1 out of 3 nonrespondent establishments subsampled from a group originally sampled at the rate of 1 out of 2 would be assigned a weight of 6. If an establishment included in the sample with certainty fails to respond, another similar establishment would be weighted to represent it.

To the estimates derived from the weighting of the sample questionnaire are added the data from secondary sources—the numbers of major bargaining situations.

The totals thus obtained are further adjusted to reduce the hazards of sampling and to take account of opening or closing of establishments between compilation of the State unemployment insurance listing from which the sample is chosen and the date of the survey. Adjustments are made to employment levels for production workers in the 2-digit Standard Industrial Classification manufacturing industry groups, as reported in the monthly employment series of the Bureau of Labor Statistics for the period covered by the summary of wage changes.[8] For example, if the estimate of production worker employment in an industry group derived from the sample is 100,000 but the Bureau's estimate of employment in that industry group was 110,000 workers, each employment count would be multiplied by $\frac{110,000}{100,000}$ or 1.1 The resulting industry group estimates would be added to provide the estimates for all manufacturing.

The major series for manufacturing and nonmanufacturing combined is not adjusted in this fashion, since it is presumed to be all inclusive.

A new sample of nonunion and small unionized plants in manufacturing usually is selected every 3 years. Establishments with fewer than four workers are omitted because in many States they are not covered by these unemployment compensation programs. After the initial contact, establishments of any size that indicate that they have a policy of adjusting wages on an individual basis, rather than by means of general wage changes, are omitted from further survey.

Presentation and Analysis

Preliminary information on the "package cost" and general wage changes resulting from collective bargaining settlements involving the major situations is issued in press releases about 3 weeks after every quarter and the information is also summarized in *Current Wage Developments* (See Chapter 23 for a description of the package cost program). Final information on wage and benefit changes is not available until the end of the year. It is presented in *Current Wage Developments* and the *Monthly Labor Review.* Yearend summaries also present information on total effective wage changes—those negotiated in the period plus deferred and cost-of-living changes resulting from settlements in prior years but going into effect in the current year. Information is presented for manufacturing industries, for nonmanufacturing industries, and for both combined.

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[8] See chapter 2.

Quarterly summaries of the manufacturing data are published in *Current Wage Developments* and the article covering the full year also appears in the *Monthly Labor Review.* The 3-, 6-, and 9-month summaries, which are based on preliminary data, stress wage changes resulting from settlements or management decisions made during the period, while the yearend article, which is based on final data, also analyzes trends in the size, frequency and type of wage changes, and the prevalence and results of wage escalation policies. Because it is based on data for both large and small unionized and nonunionized establishments, the manufacturing analysis can make many other useful comparisons of its components.

Uses and Limitations

The data are used extensively by labor, management, and the Federal Mediation and Conciliation Service in collective bargaining; by private institutions and universities in studies of industries or groups of industries; and by local and Federal Government agencies interested in the current economic picture to determine trends in wage and benefit changes as well as for wage, income, and gross national product forecasts.

Since the sample is relatively small, data are not presented for individual industries.

—GEORGE RUBEN

Chapter 18. Employer Expenditures for Employee Compensation

Background

The measurement of employer expenditures for employee compensation and the composition of payroll hours was undertaken by the Bureau of Labor Statistics (BLS) to fill a large gap in the statistics of employee compensation and hours paid for.

Prior to World War II, compensation for American labor consisted mainly of wages and salaries for time worked or units produced. Under the New Deal, however, additional payments were required under various social insurance programs, and, later, during the years of the Second World War, employers were encouraged by the policies of the War Labor Board to grant wage supplements instead of wage increases, e.g., vacations, hospitalization. Shortly after the war, the NLRB ruled that pension plans were within the purview of collectively bargained agreements.[1] Expenditures for these and other compensation elements, in addition to pay for working time, began to comprise a substantial portion of the total compensation of labor.

As early as 1875 the American Express Company instituted a private pension plan.[2] In 1929, a private study[3] indicated that there were almost 400 such plans, and by 1968 there were about 34,100 pension plans and 157,700 private pension or welfare plans in America.[4]

Paid vacations and holidays also have a relatively short history for most workers. Paid vacations were fairly well established for salaried workers by the middle of the nineteenth century. Industrial workers, however, first started to receive paid vacations around the turn of the century, and not until after World War I did the principle of paid vacations begin to assume importance in the development of labor policy; paid holidays generally were not found in industry until World War II, although it had been customary for salaried workers to receive pay for time not worked on designated holidays. By 1968, approximately 7 percent of the production worker hours paid for in manufacturing industries were leave hours, almost all of which were vacation and holiday hours.

The importance of recent changes in the structure of compensation may be illustrated by examining those that occurred for manufacturing production workers between 1959 and 1968. During that period pay for working time increased from $2.23 to $3.02 an hour or about 35 percent. At the same time, employee expenditures for all other elements of compensation increased from 38 cents to 69 cents an hour or about 76 percent. Thus, the relative importance of pay for working time decreased from 85.4 percent of total compensation in 1959 to 81.8 percent in 1968.

The Bureau has for many years recognized the necessity of studying outlays for employee compensation. Early attempts, however, were limited to exploratory work on methodology and the availability of data.[5] By 1959, many of the technical and conceptual problems had been sufficiently resolved to permit the initiation of a regular program.

The first survey in the program, 1959 expenditures in manufacturing, was followed by a 1960 mining study; a 1961 finance, insurance, and real estate survey, and another manufacturing industry study in 1962. The 1963 study of expenditures for salaried (white-collar) workers, which covered most nonagricultural industries in the private sector, represented the first shift in program emphasis from an industry to an economy-wide orientation. Since then, the program has been redesigned to cover all employees in the private nonfarm sector and to cover all significant items of employee compensation.

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[1] *Inland Steel vs. National Labor Relations Board*, 170 Federal Reports, Second Series 247 (1948), 251 (1949).

[2] This was the first recorded private pension plan in America.

[3] Latimer, Murray Webb. *Industrial Pension Systems in the United States and Canada*, Industrial Relations Counselors, Inc., New York, 1932.

[4] Total active plans covering 26 employees or more for which descriptions had been filed with the U.S. Department of Labor by April 1, 1968 under the provisions of the Welfare and Pension Plans Disclosure Act, as amended (P.L. 85–836 as amended by P.L. 87–420).

[5] *Problems in Measurement of Expenditures on Selected Items of Supplementary Employee Remuneration, Manufacturing Establishments, 1953* (BLS Bulletin 1186, 1956); *Wage Structure: Basic Iron and Steel, January 1951* (BLS Series 2, No. 81, 1951); *Wage Structure: Electric and Gas Utilities, September 1957* (BLS Report 135, 1958).

Description of Survey

The survey relates to employee compensation practices, employer expenditures arising from these practices, and to all hours for which payment is made—hours worked, paid hours of vacation, holiday, sick leave, and civic and personal leave.

The program is designed to provide data biennially for the entire private nonfarm sector; separate information is given for manufacturing and nonmanufacturing industries. In the intervening years a number of individual manufacturing and nonmanufacturing industries are studied. Both types of studies provide data for all employees and for office and nonoffice employees separately. Survey coverage extends to the 50 States and the District of Columbia and separate data are provided for broad economic regions.

The data relate to cash disbursements of employers and the hours-paid-for during a calendar year. Data for a lesser period of time do not completely reflect the outlays made by employers and the hours-paid-for. Paid leave time, for example, usually is spread unequally throughout the calendar year; similarly, expenditures for many of the legally required insurance programs stop after a specified maximum amount is earned by each worker during the year. These practices result in wide variations between expenditures in the early part of the year and in the latter part of the year.

Employee compensation is increasing continually in complexity and magnitude. Practices differ by industry group and new supplementary practices are being added. Each survey is designed to show the individual characteristics of compensation practices in particular industries without impairing comparability with others. This objective is accomplished by retaining the same basic reference framework.

Expenditures

The expenditures studied are considered to constitute the major elements of employee compensation in American industry. The expenditures, and therefore their measurement, fall into two broad groups determined by the way they are paid: payments made directly to the workers and payments made to a third party on behalf of the workers.

Direct payments include pay for working hours; pay for hours not worked such as vacations, holidays, sick leave, and civic and personal leave; premium pay for overtime, weekend, holiday, and shift work; nonproduction bonuses; and severance pay. The total of these payments constitutes the gross payroll.

Indirect payments are those made by the employer on behalf of the worker to funds, trustees, insurance companies or Government agencies which may make a payment to the worker at a later date or provide full or partial economic security against a future contingency (i.e. unemployment, retirement, medical expenses etc.). The programs from which these expenditures arise are either legally required or voluntary. Legally required programs include social security, unemployment insurance, workmen's compensation, and State temporary disability insurance. Voluntary plans studied are life, accident, and health insurance; retirement plans; vacation and holiday funds; severence and supplemental unemployment benefit funds; and savings and thrift plans.

Payroll Hours

The payroll hours studied are all hours for which the workers receive pay. These hours consist of plant or working hours, and vacation, holiday, sick and other hours of paid leave. Although an hour normally is defined as 60 minutes of elapsed time, a payroll hour does not necessarily consist of 60 minutes. For example, hours worked on a day that would otherwise have been a paid holiday are paid for twice—once as a paid holiday, and once as working hours. Therefore, an 8-hour holiday worked for which 16 hours of payment was made is counted as 16 hours—half of which are holiday hours and half are plant-hours. Conversely, some hours of leave are paid for at less than the regular rate and only the equivalent hours are counted. Each overtime hour worked at premium rate is counted as 1 plant-hour.

Establishment Policies

Although the data on company policies are used primarily in the review and analysis of the expenditure and hours data collected in the survey, these policies also have significance in their own right, and often signal changes in supplementary practices before actual expenditures are incurred. In addition, certain characteristics of American industry are measured on a national basis and the relationships among these characteristics studied. Examples are the actual distribution of workers by amount of vacation and the degrees of unionization.

Data Sources and Collection Methods

The data are obtained from establishment records. Generally, no single record is sufficient and several record sources must be summarized to arrive at annual totals. The data are entered by the employer on preprinted forms in accordance with detailed instructions.

Not all companies keep records in the detail requested and approximations in these cases may be accepted. In general, two types of approximations are used. First, if the establishment records are kept for a broader grouping of employees than are being studied, the prorated share for the workers included in the survey is computed on the basis of employment, man-hours, or payroll, whichever is most appropriate. Second, by using collateral data, estimates are made where records are not kept but the practice is observed. For example, the expenditures for holiday pay may be approximated by multiplying the number of hours paid for holiday leave by average straight-time hourly earnings. Errors occurring from the use of these approximations would have to be in the same direction in substantially all the cases (overstatement or understatement of the actual values) to have a material effect on the accuracy of the results.

Data are collected primarily by mail, although personal visits are made to many of the large employers and to a sample of the establishments that have not responded to a second mailing of the questionnaire. A questionnaire form used in the expenditure study is reproduced on pages 164–167.

Sampling Procedure

The surveys are conducted on the basis of a highly stratified probability sample of establishments selected by industry, location, and employment size. The samples generally are designed to yield reliable data for an industry division at the national levels, in four broad economic regions, and for major industry groups.

The lists of establishments from which the samples are selected are those maintained by the State agencies administering the employment insurance laws. These lists show the employment, industry classification, and location of all establishments covered by those laws in each State. Since some States do not cover establishments with fewer than four employees under the unemployment insurance (UI) law, the samples exclude establishments in that size group. (See method of estimation for treatment of the employment in such establishments.) Some establishments in particular industries are exempted from the UI laws even though they employ more than four workers. The data used in sampling these establishments are obtained from lists compiled by regulatory Government agencies, trade associations, and other sources.

Within each industry, the sample is selected to yield the most accurate estimates possible with the resources available—the principle of optimum allocation. This is done by including in the sample a greater proportion of large establishments than of small. In general, an establishment's chance of selection is roughly proportionate to its employment size.

A subsample of establishments failing to reply to the mail inquires is selected to represent all nonrespondents, following the same general plan as is used in the original sample. Establishments in this subsample are visited personally, instead of being solicited again by mail.

Estimating Procedures

Data for each sample establishment are weighted in accordance with the probability of selection of that establishment. In the individ-

BLS 2868
(Rev. '69)

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Budget Bureau No. 44-R1300
Approval expires 10-31-71

← Location of unit for which data are requested.

Expenditures for Employee Compensation, 1970

Gentlemen:

The Bureau of Labor Statistics is conducting an important survey of how much companies spend for employee compensation—for wages and salaries and for legally required and private programs which provide for employees' health and welfare. The Government has used such information from earlier surveys to aid in formulating economic policy and asks that you assist it by completing this form.

Information from the survey will be of value to your company also, since it will enable you to compare your expenditures for employee compensation with those made by industry in general. Keep a copy of your report—an extra form is enclosed. When the Bureau's report on the survey is issued, we will send you a copy and show you how to compare data for your company with the national averages.

Your report will be held in confidence and will be seen only by sworn employees of the Bureau. Nothing will be released relating to individual companies.

Please complete the form within 3 weeks and return it in the enclosed envelope. If you have questions about the information requested, or if you need assistance in completing the form, phone the Bureau collect at area code 202, 961-4019 or 961-4030. Thank you for your cooperation.

Sincerely yours,

Geoffrey H. Moore

Geoffrey Moore
Commissioner

I. Company official to contact if there are questions about this report:

Name and title (Please print or type) ____________________ Area code, phone no.

II. Units covered by this report:

Is this questionnaire being completed for the unit(s) designated above?

☐ Yes What is the principal product, service, or activity of this unit? ____________________

☐ No, our records make it impossible to report separately for the unit designated above. Units in addition to the one for which data are requested are included in this report.

Please complete Item VII at end of questionnaire to describe the units covered.

III. Average 1970 employment in units covered by this report:

Please enter the average number of employees in each category during 1970. Include full- and part-time employees. Types of employees in each category are described below.

A. Office employees ____________________
B. Nonoffice employees ____________________
C. Total 1970 average employment ____________________

OFFICE EMPLOYEES—Include all employees in executive, administrative, and management positions, above the working supervisor level. Also include supervisory and nonsupervisory professional employees and their technical assistants; employees engaged in office clerical operations; and all salespersons whose sales activities are primarily performed outside of the establishment (e.g., real estate salesmen, and door-to-door salesmen).

NONOFFICE EMPLOYEES—Include all employees, except office employees as defined above, in nonsupervisory, nonprofessional positions. Include employees engaged in fabricating, processing, or assembling; building or excavating; mining, drilling, or pumping; maintaining or repairing; shipping, receiving, handling, warehousing, packing, or trucking; retail sales; operating or working on moving vehicles (buses, boats, etc.); janitorial work; guard or watchman work; and similar activities.

TOTAL EMPLOYMENT—Is the sum of office plus nonoffice employees. Proprietors, members of unincorporated firms, and unpaid family workers are not considered to be employees and are excluded from the survey.

Instructions for Specific Items

Item IV.

A. Gross payroll—total of wages, salaries, and other payments made during 1970 before any deductions. The amount should equal wages reported on Internal Revenue Service Forms W-2 as subject to Federal withholding taxes, or total remuneration reported on IRS Form 940, Employer's Annual Federal Unemployment Tax Return 1970, Schedule B, Item 1.

A-2. Pay for overtime and weekend and holiday work—for overtime, report the straight-time pay for work beyond the normal workweek in A-2a and premium pay in A-2b. For example: If overtime is paid at time and one-half, report two-thirds of this pay in A-2a and one-third in A-2b.

For work on weekends, holidays, or during vacation periods—report the regular pay for work in A-2a, and the premium pay for work on weekends, holidays, or during vacation periods in A-2b. Payments made in lieu of time off for holidays or vacations should be excluded from A-2 and included in A-4. For example: An employee worked on a holiday. He received his regular pay for working; plus one-half his regular pay as a premium for having to work on a holiday; plus his regular holiday pay. Report his regular pay for working in A-2a; the premium in A-2b; and the regular holiday pay in A-4b.

A-3. Shift differentials—total expenditures for pay above regular day-shift rates for work on late shifts. Include pay for hours not worked. For example, if late-shift employees work 7½ hours a day but receive pay for 8 hours report the total of the one-half hour payments.

A-4. Pay for leave—only payments that were part of the establishment's gross payroll. Exclude payments to funds, trustees, etc. (Report these in C-3.) If an employee received both "pay in lieu of time off" and "pay for work" include only "pay in lieu of time off" here.

A-5. Nonproduction bonuses—total amount paid for nonproduction bonuses including lump-sum payments under profit-sharing plans, and other irregular or seasonal bonuses (such as attendance, Christmas, or yearend bonuses). Proceeds of profit-sharing plans which are paid into savings and thrift funds or retirement plans should be reported as expenditures for a private welfare plan (IV-C).

A-6. Severance pay—total of all payments made by the establishment to employees because of temporary or permanent severance of employment. Exclude payments to funds, and to pensioners under the provisions of pay-as-you-go pension plans. Report these in IV-C.

B. Legally required insurance—net liability incurred during 1970 under the provisions of State and Federal laws for each program. Exclude payments made in 1970 for 1969, but include payments made in 1971 for 1970. Include payments to government agencies, insurance companies, and to employees under self-insured plans. Exclude payments made by or withheld from employees.

Required Payments—

Social Security: In 1970 the employer's payment was 4.8 percent of the first $7,800 paid each employee, or a maximum of $374.40 per employee. See Form 941—Employer's, Quarterly Federal Tax Return which you filed in April, July, and October 1970 and January 1971. Report the sum of one-half the FICA Tax reported on line 5 for the 4 quarters.

Unemployment insurance—Federal: In 1970 the employer's payment was 0.5 percent of the first $3,000 paid each employee or a maximum of $15.00 per employee. See IRS Form 940 for 1970, Schedule A, Item 16. Railroads include total payments under Railroad Unemployment Insurance Act.
State: In most States the payment was at varying rates on the first $3,000 paid each employee. See IRS Form 940 for 1970, Schedule A, Column 9.

C. Private welfare plans—net payments (after deduction of refunds, rebates, and dividends) made during 1970 by the establishment to funds (including union-management funds), trustees, insurance companies, and payments made under the provisions of self-insured plans to employees or their beneficiaries. Include payments for current employees, employees on layoff, retired employees and their dependents. Exclude employee contributions and all administrative costs incurred by the establishment. Also exclude payments made by funds, trustees, and insurance carriers to your employees or their beneficiaries.

Life, accident, and health insurance: Life, accidental death and dismemberment, sickness and accident, wage and salary continuance insurance, and death benefits; and hospitalization, surgical, medical, dental, optical, and drug plans. Exclude expenditures for in-plant medical care and visiting nurses or physicians.

Pension and retirement plans: Direct payments to pensioners under a pay-as-you-go pension plan, payments under profit-sharing plans deferred until retirement, and payments for past and current liabilities under funded plans.

Item V.

Total number of hours paid for—all hours worked at straight time, all hours worked at overtime, all paid leave hours, and hours equivalent to payments made by the establishment directly to the workers for other hours not worked but paid for.

B. Number of overtime hours—all hours for work beyond the normal workday or workweek for which straight-time or premium payments were made during 1970.

C. Number of leave hours—report hours equivalent to the payments made and not the actual time taken off. For example: 3 hours paid for at two-thirds the regular rate should be reported as 2 hours. Include leave hours for which payment was made instead of time off.

General Instructions

If your records for an item combine data for office and nonoffice employees, please prorate the combined data between the two employee groups in the most appropriate manner. If it is not possible to prorate the combined data, enter the total figure under office and indicate "combined" under nonoffice. If your records combine data for several items, prorate the combined figure among the items to which it related in the most appropriate manner OR report the combined figure and clearly indicate to which items it relates. If it is not possibe to make an estimate of expenditures or hours for an item, please enter "not available" on the appropriate line. Please complete all items. If there were no expenditures or hours for an item, enter "0."

For each item, enter totals for the year 1970	Office	Nonoffice
IV. Total compensation in 1970:	$	$
A. Gross payroll --		
1. Straight-time pay ----------------------------------		
2. Pay for overtime and weekend and holiday work ---------		
a. Straight-time pay for overtime and weekend and holiday work ------------------------------------		
b. Premium pay for overtime and weekend and holiday work ------------------------------------		
3. Shift differentials -----------------------------------		
4. Pay for leave --		
a. Vacations --		
b. Holidays ---		
c. Sick leave ---		
d. Civic and personal leave ---------------------------		
5. Nonproduction bonuses -------------------------------		
6. Severance pay --		
B. Employer Expenditures for Legally Required Insurance		
1. Social security or railroad retirement -----------------		
2. Unemployment insurance -----------------------------		
a. Federal or railroad unemployment-------------------		
b. State --		
3. Workmen's compensation and payments under Federal Employer's Liability Act --------------------------		
4. Other, e.g., State temporary disability insurance (specify): ---		
C. Employer Expenditures for Private Welfare Plans		
1. Life, accident, and health insurance -------------------		
2. Pension and retirement plans -------------------------		
3. Vacation and holiday funds --------------------------		
4. Severance pay and supplemental unemployment benefit funds ------------------------------------		
5. Savings and thrift plans -----------------------------		
6. Other private welfare plans (specify): ---		
V. Total number of hours paid for in 1970 -----------------	Hours	Hours
A. Number of straight-time hours worked ------------------		
B. Number of overtime hours worked ----------------------		
C. Number of leave hours paid for -----------------------		
1. Vacation --		
2. Holiday ---		
3. Sick leave ---		
4. Civic and personal leave ----------------------------		

VI. Establishment practices and policies:

A. Paid vacations. Report the number of employees who received vacation pay during 1970 directly from the establishment according to the amount of pay.

Employees	Number of employees receiving—						
	No vacation pay	Under 1 week's pay	1 and under 2 weeks' pay	2 and under 3 weeks' pay	3 and under 4 weeks' pay	4 and under 5 weeks' pay	5 weeks' pay or more
Office ----------------							
Nonoffice -------------							

B. Paid holidays. Enter the number of days per employee. If more than one practice existed for an employee group, report that which applied to the greatest number in the group. If the greatest number of employees received no paid holidays, enter "0."

	Full days	Half days
Office employees-------	____________	____________
Nonoffice employees----	____________	____________

C. Sick leave. Did the establishment have a practice or a policy (even though there may have been no expenditure) for providing paid sick leave for any—

	Yes	No
Office employees--	☐	☐
Nonoffice employees---	☐	☐

D. Civic and personal leave. Did the establishment have a practice or a policy (even though there may have been no expenditure) for providing paid civic leave (military, jury, witness, voting, etc.) or personal leave (such as for death in family) for any—

Office employees--	☐	☐
Nonoffice employees---	☐	☐

E. Life, accident, and health insurance. Did the establishment finance any of the following insurance plans for–

	Life	Sickness and accident	Hospitalization or medical
Office employees-----	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Nonoffice employees--	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

Did employees pay for part of any of these insurance plans (answer NO if payment was only for additional benefits or coverage for dependents)

	Life	Sickness and accident	Hospitalization or medical
Office employees-----	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Nonoffice employees--	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐

F. Pension and retirement plans. Did the establishment finance such a plan for—

Office employees--	☐	☐
Nonoffice employees---	☐	☐

Did employees pay for part of any of these plans (answer NO if payment was only for additional benefits)

Office employees--	☐	☐
Nonoffice employees---	☐	☐

G. Collective bargaining. Did union-management agreements cover a majority of the—

Office employees--	☐	☐
Nonoffice employees---	☐	☐

H. Regular workweek, 1970. How many hours (e.g., 44, 40, 37.5, etc.) were normally worked each week by the majority of the—

Office employees-- ____________ Hours per week
Nonoffice employees--- ____________ Hours per week

VII. Units included in report (if different from that requested in address box):

If this report relates to units in addition to the one designated at the top of page 1, please provide the following information for each unit included in the report.

Location	Average 1970 employment		Principal product, service, or activity
	Office	Nonoffice	

ual industry studies the selection is based on establishment size strata. Thus, a reporting unit which is in a stratum at which the selection probability was set, for example, 1 out of 5 establishments, will be given a weight of 5, representing itself and four other establishments in this same stratum. In the biennial studies of the entire private nonfarm sector, the probability of selection is proportionate to establishment employment size. Thus, a reporting unit employing 1000 workers, in a sample where the employment size probability base was set at 10,000, will be given a weight of 10, representing itself and other establishments having an aggregate employment of 10,000 workers. Under both procedures all establishments over a certain size are included.

The sample of nonrespondents for which data are collected by Bureau field representatives is weighted appropriately to represent all nonrespondents.

In the event that usable data cannot be obtained from any unit visited in person, whether among the followup of nonrespondents or among large units often selected in the sample with certainty, its weight is assigned to units in the sample with the most similar industry-size-location characteristics.

All estimated totals derived from such weighting procedures are adjusted further by the level of total employment or other appropriate measure for the survey year, based on data from the Bureau's monthly establishment employment statistics program, in each of four broad economic regions. For instance, if the level of the aggregates, as derived from the weighting procedures, is 40,000,000 in an industry-region class and the corresponding level as shown by the employment statistics program is 44,000,000, the totals of the survey items would be multiplied by 1.1. The adjusted data represent all establishments, including those having fewer than four employees, in the industries studied.[6]

Some improvisation is necessary in the construction of such annual benchmark totals. The monthly employment series provides data for only one pay period each month, and the estimate of annual totals is made by multiplying by the average number of weeks in a year (52.14).

Information from other sources, wherein a detailed breakdown by State or region is shown, is used as a basis for prorating the current employment (or hours) estimates into regional aggregates. Such sources include the *Census of Manufactures* and *County Business Patterns* (based on Social Security establishment data.)[7]

Presentation

The expenditure data on the individual elements of compensation are combined to give a measure of total employee compensation. The expenditure data for each individual element and for groups of elements are presented as a percent of total compensation, in cents per paid hour, and in cents per working hour. These measures are shown for all establishments, as well as for only those establishments that had an actual expenditure for a particular practice during the reference year. Hours data for working hours and for paid leave hours are presented as a percent of all paid hours.

A. The expenditure ratios are calculated as follows:

1. Expenditures as a percent of total compensation for all establishments=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate compensation in all establishments}} \times 100$$

2. Expenditures as a percent of total compensation for establishments reporting expenditures=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate compensation in establishments reporting expenditures for the practice.}} \times 100$$

B. The expenditure rates are calculated as follows:

1. Expenditures in cents per paid hour for all establishments=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate paid hours}}$$

2. Expenditures in cents per hour of work for all establishments=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate paid hours minus aggregate paid leave hours}}$$

---

[6] See chapter 2, "Employment, Hours and Earnings".

[7] U.S. Department of Commerce, Bureau of the Census, *County Business Patterns* (various years).

3. Expenditures in cents per paid hour for establishments reporting expenditures=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate paid hours in establishments reporting expenditures for the practice.}}$$

4. Expenditures in cents per paid working hour for establishments reporting expenditures=

$$\frac{\text{Aggregate expenditures for the practice}}{\text{Aggregate paid hours minus paid aggregate leave hours in establishments reporting expenditures for the practice.}}$$

The distribution of workers by establishment expenditure ratios and rates is published, as well as the averages of ratios and rates. Expenditures also are shown by selected establishment characteristics such as size, compensation level, unionization, and, for certain surveys, by area.

Analysis

The expenditure data describing the payroll or nonpayroll elements of compensation are presented in summary by this characteristic. However, the analysis of the data is related to the benefit function of each element. Thus, for analytical purposes, elements of compensation that provide similar or interchangeable benefits are grouped together. The following groups of compensation elements are studied:

1. Pay for working time; straight time pay, and premiums for overtime, weekend, holiday, and shift work.
2. Pay for leave time; vacations, holidays, miscellaneous leave of absence, and payments to vacation and holiday funds.
3. Payments for retirement programs; social security and private retirement plans.
4. Payments for health and related programs; life, accident, and health insurance, sick leave, and workmen's compensation.
5. Payments for unemployment benefit programs; unemployment insurance, severance pay, and severance pay funds and supplemental unemployment benefit funds.
6. Nonproduction bonuses.
7. Savings and thrift plans.

Data are presented on the importance of various types of paid hours relative to all paid hours. Information is also published on the number of paid holidays and number of weeks of paid vacation received by workers.

Uses and Limitations

Data from the surveys are used by employers in comparing their expenditure and hours practices with the averages for their industry and with those of other establishments having similar or dissimilar characteristics (industry, size, location, union status, and average earnings levels of workers). Labor and management use the data in collective bargaining; and Government uses the statistics in the formulation of public policy, in producing estimates of industry output per man-hour, and in making international comparisons. They also are used in deriving estimates of the amount and type of labor compensation and the nature of the hours for which compensation is received by workers.

As indicated earlier, the expenditures studied comprise the significant elements of employee compensation in American industry. The aggregate of the expenditures studied represents total employee compensation. It does not, however, represent total labor cost which is a more encompassing concept and includes factors such as the cost of recruiting and training labor, the administrative expenses incurred in administering benefit programs, and many other expenditures resulting from the use of labor as a factor of production. Some of these expenditures may be important in particular establishments.

The expenditures and hours data are subject to both sampling and reporting errors, the precise magnitude and direction of which are not known. Nevertheless, the errors resulting from sampling generally are considered to fall within acceptable confidence ranges; and reporting errors, to have a material effect on the accuracy of the results, would have to be in the same direction in substantially all of the cases. The omission of establishments with fewer than four employees from the samples may result in some bias, but it is very small since less than 1 percent of the workers in most industries are employed by such establishments.

Technical References

Number

1. U.S. Department of Labor, Bureau of Labor Statistics. *Problems in Measurement of Expenditures on Selected Items of Supplementary Employee Remuneration, Manufacturing Establishments, 1953* (Bulletin 1186, 1956).

   A study of the availability of records, willingness and ability of industry to provide data, the quality of expenditure data, and other matters of methodology and definition.

2. ——. *Employer Expenditures for Selected Supplementary Remuneration Practices for Production Workers in Manufacturing Industries, 1959* (Bulletin 1308, 1962).
3. ——. *Production Workers in Mining Industries, 1960* (Bulletin 1332, 1963).
4. ——. *Employer Expenditures for Selected Supplementary Remuneration Practices in Finance, Insurance, and Real Estate Industries, 1961* (Bulletin 1419, 1964).
5. ——. *Employee Compensation in the Private Nonfarm Economy,* 1966 (Bulletin 1627, 1969).
6. ——. 1967 Industry studies titled "Employee Compensation and Payroll Hours." Seven reports (1969); *Banks* (362); *Research Laboratories* (363); *Confectionery* (364); *Structural Steel* (365); *Hotels & Motels* (366); *Laundries. Cleaning & Dyeing Plants* (367); *Men's & Boys Shirts* (368).
7. ——. *Employee Compensation in the Private, Nonfarm Economy,* 1968 to be published in 1971.

   Each expenditure bulletin contains descriptive information on the detailed procedures and techniques used in the study.

8. ——. Bauman, Alvin, "Measuring Employee Compensation in U.S. Industry," *Monthly Labor Review,* October 1970, pp. 17–23.

—ALVIN BAUMAN

Chapter 19. Work Stoppages

Background

Work stoppage statistics are compiled by the Bureau of Labor Statistics to provide a quantitative measure of the extent to which disputes between labor and management result in strikes or lockouts and of the immediate economic disruption resulting from such stoppages.[1] When considered along with general economic measures, these statistics also serve at times as a broad indicator of the state of industrial unrest.

The first attempt by any Federal agency to compile statistics on strikes was made in 1880,[2] when the Bureau of the Census sent questionnaires to employers and workers involved in all disputes which were noted in the public press during the year. Information was received on 762 situations. Some data were obtained on the causes of strikes and their results, but not on the number of workers involved or resultant man-days of idleness.

The next collection of strike statistics was undertaken in 1887, when the Bureau of Labor, then in the Department of the Interior, examined files of newspapers, trade journals, and commercial periodicals for references to strikes for all years from 1881 to 1886. Staff members visited the areas where strikes were reported and obtained detailed information about each strike from every available person or source. Studies utilizing basically the same procedures subsequently were made in 1894, 1901, and 1906. As a consequence of these efforts, data were published for the 1881–1905 period on the number of strikes and workers involved, with breakdowns by industry and State; the number of establishments involved; and the percentage of strikes involving labor organizations.

No Federal agency collected national information on stoppages occurring during the 1906–13 period. In 1914, relying exclusively on printed sources, the Bureau of Labor Statistics attempted to compile a record of all strikes and lockouts during the year. In the following year, the Bureau inaugurated a method for the collection of strike and lockout material which has been followed, with modifications, since that time. Briefly stated, the procedure was to send questionnaires to the parties involved in work stoppages, following receipt from the press and other sources of notices relating to these situations.

Improvements in the program in 1927, in particular the procurement of data on the number of workers involved in all stoppages and the computation of man-days of idleness, inaugurated the modern series of monthly and annual strike data.[3]

Description of the Series

The present series on work stoppages covers all strikes and lockouts known to the Bureau of Labor Statistics and its cooperating agencies. It covers all that continue for 1 full day or shift or longer and involve six workers or more. These limitations on size and duration, somewhat arbitrary but of long standing, are necessary for reasons of efficiency, and, in part, because of the difficulty involved in defining, identifying, and securing information on strikes that last a few hours or less.

The Bureau defines a strike as a temporary stoppage of work by a group of employees to express a grievance or enforce a demand. A lockout is defined as a temporary withholding of work by an employer (or a group of employers) to enforce terms of employment on a group of employees. Since 1922, the Bureau has made no attempt to distinguish between strikes and lockouts in its statistics; both types are included in the term "work stoppages" and, for the sake of convenience in writing, in the term "strikes."

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[1] Throughout this chapter, the terms "work stoppage" and "strike" are used interchangeably; both terms, unless otherwise noted, also include lockouts. The definitions, terms, and classifications used by the Bureau in compiling work stoppage data were adopted for statistical and research purposes and have no legal significance.

[2] On the State level, the Bureau of Labor Statistics of Massachusetts, issued a report in 1880 on strikes in that State from 1825. In 1881, the Bureau of Industrial Statistics of Pennsylvania issued a report on strikes in that State from 1835.

[3] For additional information on the early history of the work stoppage statistics program, see BLS Bulletin 651, *Strikes in the United States, 1880 to 1936* (1938).

Although an employer-employee dispute is implicit in these definitions, some inclusions in the Bureau's series relate only indirectly to this concept. For example, jurisdictional strikes and rival union disputes between two unions or more often have the employer on the sidelines. In a sympathy strike, the issue of the stoppage does not usually involve the immediate employer. Moreover, protest strikes against the actions of governmental agencies are not the result of a dispute between an employer and his employees.

All stoppages, whether or not authorized by the union, legal or illegal, are counted. On the other hand, the Bureau's series excludes strikes of American seamen or other workers in foreign ports and strikes of foreign crews in American ports. Also excluded are so-called slowdowns, where employees continue at work but at deliberately reduced production speed, and those instances in which workers report an hour or two late each day as a protest gesture or quit work several hours before closing time to attend rallies or mass meetings.

The number of work stoppages occurring during a given period provides a measure of the frequency of disputes; the severity and effect of such actions are measured by the number of workers involved, duration, and the resultant man-days of idleness. The basic statistical unit in the Bureau's series is the individual strike or lockout. If groups of employees (regardless of their number and type and location of employment) join in a work stoppage for a common objective, their action is classed as a single strike.

The figure used for the number of workers involved in a strike or lockout is the maximum number actually made idle in the establishment or establishments directly involved. No distinction is made in arriving at this figure between the active participants in the strike, the number of union members or workers covered by an agreement, and those sent home by the employer when a stoppage by one group or department prevents plant operation.

Man-days of idleness, like the number of workers involved, are based on the idleness at the establishment or establishments directly involved. Workers involved multiplied by work-days lost equal total man-days idle. In instances where the number of workers idle varies during the period of the stoppage, appropriate adjustments are made in this calculation. Allowance is made in these computations for holidays and days not normally worked.

Data Sources and Collection Methods

The task of collecting strike data has two basic elements: (1) to learn of work stoppages when and wherever they occur, and (2) to obtain the necessary facts regarding each situation as quickly as possible.

Information about the existence of stoppages currently is obtained from various sources, including: (1) clippings from daily and weekly newspapers throughout the country provided by commercial clipping services; (2) notices received directly from the Federal Mediation and Conciliation Service; (3) a periodic compilation by the local offices of the State employment security agencies, provided through the U.S. Training and Employment Service of the U.S. Department of Labor; (4) a number of other State agencies, such as State mediation boards and labor departments; (5) various employers and employer associations; (6) international unions and their publications; (7) firms under contract to the Atomic Energy Commission; and (8) other Federal agencies and commissions.

Aside from the clippings from newspapers and other publications, most of these sources have been developed over a period of years. As a general rule, expansion in the Bureau's "lead" sources brings an increase in the number of stoppages reported, but has little effect on the total number of workers and man-days of idleness, because the added stoppages tend to be small.

After the receipt of notices regarding the existence of work stoppages, the Bureau mails questionnaires to the parties involved to secure direct information on each stoppage. Should a reply not be received within 3 weeks, a second questionnaire is mailed, and, in the case of continued nonresponse, a mailogram or telegram may be sent, or an effort made to secure the necessary data by telephone. In some instances of nonresponse, field representatives of the Bureau secure the necessary data; in others, cooperating State agencies may be asked to contact the parties.

The types of information sought by the Bureau through its questionnaire have changed over the years, partly in response to changing needs. The primary function of these reports is to compile statistics, not to keep records on the strike activity of individual firms and unions. The separate questionnaires currently used for private and public sector disputes are shown on pages 174–176.[4]

Although strikes, by their very nature, are usually matters of public knowledge and of reporting by newspapers and other publications, the Bureau holds confidential the individual reports submitted by employers and unions, as well as supplementary data collected through State or Federal agencies. The rules of confidentiality observed here are similar to those followed in other Bureau surveys.

Estimating Procedures

Since the Bureau is able to obtain information on virtually all work stoppages within the scope of its definition, estimating is necessary only in the preparation of its monthly reports on the level of strike activity in the United States as a whole. The availability of reasonably accurate data on the larger stoppages at the time these estimates are prepared—approximately 4 weeks after the end of the month of reference—assures approximate conformity to the final statistics which are based almost exclusively on the parties' replies.

Monthly estimates are prepared on the number of stoppages, the number of workers involved, and man-days of idleness. As there is a lag between the occurrence and reporting of a number of relatively small strikes, the number of stoppages beginning during a given month is estimated by increasing the number of strikes on which leads have been received by a percentage which is fixed for each calendar month. An estimate of the total number of stoppages in effect during the month is obtained by supplementing the latter estimate by a percentage of the stoppages in effect during the prior month.

In estimating the number of workers involved and total idleness, efforts are made to obtain as much preliminary information as possible on the size and duration of individual large stoppages—those of at least 500 workers or 5,000 man-days of idleness. To the known figures for these large stoppages is added the product of the estimated number of smaller strikes and the average number of workers (or man-days) that previous experience indicates for such stoppages.

In its preliminary reports, as well as in its final reports, the Bureau relates the man-days of idleness to the total estimated working time of all workers. The "total economy" measure of strike idleness, which was instituted in 1967, includes government and agricultural employees as well as private nonfarm workers in its employment count as well as in the computation of idleness ratios. Before 1967, the BLS series excluded government and agricultural workers from employment totals, but accounted for time lost by these workers while on strike. This reevaluation of methods has improved the calculations of idleness and made the Bureau's measurement of work stoppage intensity national in scope.

Analysis and Interpretation

The data presented in the parties' reports are analyzed and classified according to a number of significant factors, briefly described here:

(1) Each strike is assigned an *industrial classification* in accordance with the *Standard Industrial Classification Manual* prepared by the Bureau of the Budget.[5] In those cases in which a stoppage affects workers in more than one industry, one of two procedures may be followed. If the stoppage is small, the strike is classified in the industry in which it was initiated; in large interindustry stoppages, a

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[4] A modified form of this questionnaire is used in the case of most jurisdictional disputes and those in coal mining.

In the case of prolonged strikes, a less detailed questionnaire is sent to the parties periodically to determine the status of the stoppage.

[5] See appendix B.

BLS 817
(Rev. 1963)

Form Approved
Budget Bureau No. 44-R210

U. S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D. C. 20212

WORK STOPPAGE REPORT

Your report will be held
in confidence
Please answer all questions

NO. ____________________

This request for information relates to:

1. Employer	Name and mailing address			
2. Establishments involved in stoppage	Number of establishments directly involved or in which workers observed picket lines ________ If more than one establishment, use reverse side; if one, enter below: a. Location ________ b. Industry ________ (Indicate major type of activity and also principal products or services. e.g., Mining-bituminous coal; Construction-highways and streets; Manufacturing-wooden upholstered furniture; Wholesale trade-plumbing supplies; Transportation-motor freight.)			
3. Union involved	Name			AFL CIO ☐ Other ☐
	Local No.	Address		
4. Dates of stoppage	Stoppage began on	Settlement was reached on	Settlement was ratified on *(if applicable)*	Employees returned to work on
5. Number of workers affected	*TOTAL* workers idled at least one full shift or day ________ workers (IMPORTANT—Include *all workers* directly involved in the stoppage *and* workers made idle by lack of work in the same establishments or by observance of picket lines. If exact figures are not available, please provide estimate.) Did the number idle change significantly during the stoppage? Yes ☐ No ☐ *(If "yes," please enter changes in number idle and dates of changes on reverse side of sheet.)*			

6. Normal workweek prior to stoppage .... ________ days

7. Contract status *(check one)*

Stoppage occurred

☐ In negotiation of first contract or in obtaining union recognition
☐ In renegotiating contract terms (expiration or reopening)
☐ During term of contract (change in contract terms not involved)
☐ Other *(specify)* ________

8. *MAJOR* issues in dispute (list in order of importance)

9. Did the agreement to return to work include a procedure for handling any unsettled major issues involved in the stoppage (e.g., by submitting issues to arbitration)? Yes ☐ No ☐ If "yes", indicate the issues and the procedure agreed upon.

10. Did a Federal, State, or local government agency, or a private mediator, mediate in this dispute or assist in arranging the return to work? (Check more than one if applicable). Federal ☐ State ☐ Local ☐ Private ☐ None ☐
Please identify assisting government agency, if any ________

(Date) (Signature and title of person making report) (Company or organization)

Use reverse side for any
clarifying remarks.

Supplementary Information for Items 2 and 5:

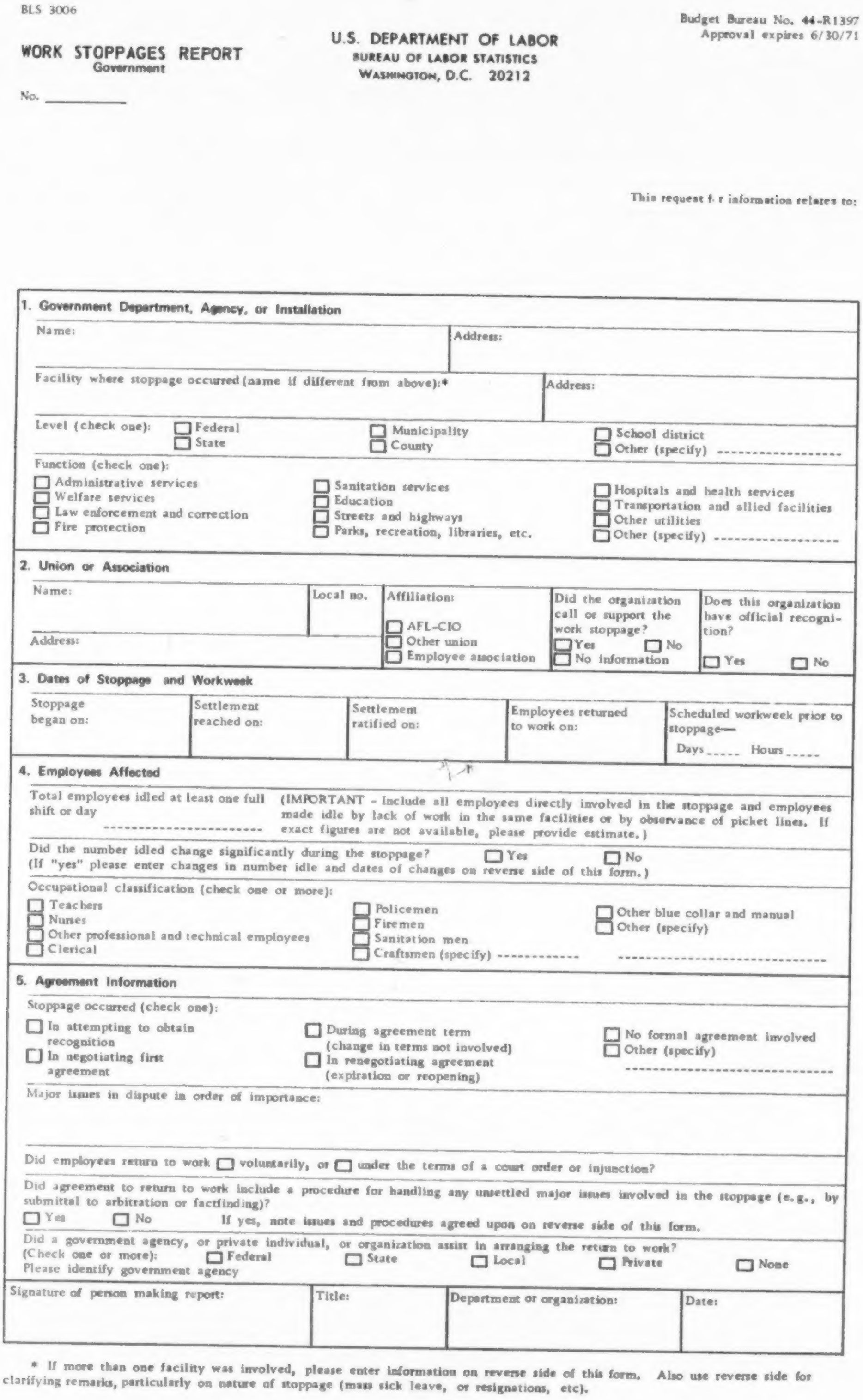
If the stoppage involved more than one establishment or if idleness varied from period to period during the stoppage, please use the following space to indicate the number idle in each establishment and the variation in idleness at different dates. Include both workers directly concerned and those made idle because of dispute in the same establishment.

IF EXACT FIGURES ARE NOT AVAILABLE, PLEASE FURNISH ESTIMATES.

Establishment involved and location (City, County, State)	Industry or principal product	Approximate number of workers idle a full shift or more	Dates this number was idle a full shift or more

REMARKS:

☆ U. S. GOVERNMENT PRINTING OFFICE: 1969—361-714



BLS 3006

WORK STOPPAGES REPORT
Government

No. ________

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS
WASHINGTON, D.C. 20212

Budget Bureau No. 44-R1397
Approval expires 6/30/71

This request for information relates to:

1. Government Department, Agency, or Installation

Name:

Address:

Facility where stoppage occurred (name if different from above):*

Address:

Level (check one): ☐ Federal ☐ State ☐ Municipality ☐ County ☐ School district ☐ Other (specify) ________________

Function (check one):

☐ Administrative services
☐ Welfare services
☐ Law enforcement and correction
☐ Fire protection
☐ Sanitation services
☐ Education
☐ Streets and highways
☐ Parks, recreation, libraries, etc.
☐ Hospitals and health services
☐ Transportation and allied facilities
☐ Other utilities
☐ Other (specify) ________________

2. Union or Association

Name:

Local no.

Address:

Affiliation:
☐ AFL-CIO
☐ Other union
☐ Employee association

Did the organization call or support the work stoppage?
☐ Yes ☐ No
☐ No information

Does this organization have official recognition?
☐ Yes ☐ No

3. Dates of Stoppage and Workweek

Stoppage began on:	Settlement reached on:	Settlement ratified on:	Employees returned to work on:	Scheduled workweek prior to stoppage— Days _____ Hours _____

4. Employees Affected

Total employees idled at least one full shift or day ______________________

(IMPORTANT - Include all employees directly involved in the stoppage and employees made idle by lack of work in the same facilities or by observance of picket lines. If exact figures are not available, please provide estimate.)

Did the number idled change significantly during the stoppage? ☐ Yes ☐ No
(If "yes" please enter changes in number idle and dates of changes on reverse side of this form.)

Occupational classification (check one or more):

☐ Teachers
☐ Nurses
☐ Other professional and technical employees
☐ Clerical
☐ Policemen
☐ Firemen
☐ Sanitation men
☐ Craftsmen (specify) ____________
☐ Other blue collar and manual
☐ Other (specify) ____________________________

5. Agreement Information

Stoppage occurred (check one):

☐ In attempting to obtain recognition
☐ In negotiating first agreement
☐ During agreement term (change in terms not involved)
☐ In renegotiating agreement (expiration or reopening)
☐ No formal agreement involved
☐ Other (specify) ____________________________

Major issues in dispute in order of importance:

Did employees return to work ☐ voluntarily, or ☐ under the terms of a court order or injunction?

Did agreement to return to work include a procedure for handling any unsettled major issues involved in the stoppage (e.g., by submittal to arbitration or factfinding)?
☐ Yes ☐ No If yes, note issues and procedures agreed upon on reverse side of this form.

Did a government agency, or private individual, or organization assist in arranging the return to work?
(Check one or more): ☐ Federal ☐ State ☐ Local ☐ Private ☐ None
Please identify government agency

Signature of person making report:	Title:	Department or organization:	Date:

* If more than one facility was involved, please enter information on reverse side of this form. Also use reverse side for clarifying remarks, particularly on nature of stoppage (mass sick leave, or resignations, etc).

stoppage is recorded for each industry affected, and the approximate numbers of workers and idleness are allocated to each.

(2) The *duration* of each stoppage is taken as the number of calendar days from its beginning to end. For stoppages which begin at a definite time and are terminated by a formal agreement, no problem arises in the determination of duration. However, some stoppages, for a variety of reasons, are never settled formally. These range from situations in which the workers gradually return to their jobs without a settlement to those in which the employer decides to go out of business. In cases of the former variety, the details of each individual situation are studied before a stoppage is terminated for statistical purposes; in the latter instances, the stoppage is terminated with the employer's announcement of his decision to discontinue operations. On occasion, if actual settlement is reached later, the statistical record of the stoppage is adjusted accordingly.

(3) *Number of establishments involved.* The standard definition of establishment is used. (See appendix B.) An establishment is a single workplace, for example a factory, mine, or store. In a widespread strike of intercity bus drivers, truckdrivers, or railroad workers, the establishment is regarded as the terminal out of which the employees work; in a strike of seamen, the ship is the establishment; and in a strike of dockworkers, the individual dock or loading place is regarded as the place of work.

(4) *Geographical classification* of stoppages followed State and city boundary lines, through 1951. Beginning in 1952, the compilation of data by Standard Metropolitan Statistical Areas superseded city boundary lines.[6] In interarea stoppages, a stoppage is recorded in each area affected, and workers and man-days of idleness are allocated proportionately.

(5) The *issues* in dispute in most strikes are many and varied, and do not always lend themselves readily to immediate and exact classification. Stoppages are classified by major issue into the following broad groupings: (a) wages, hours, and supplementary benefits; (b) union organization and security; (c) job security; (d) plant administration; and (e) inter- or intra-union matters. Each of these groups is sub-divided into more specific categories.[7]

(6) Stoppages are classified by the *contractual relationship* existing between the parties involved. The following four situations apply: (a) negotiation of the initial agreement; (b) renegotiation of an agreement; (c) agreement in effect (new contract terms not involved); and (d) no contractual relationship.

(7) The *union involved* is another major classification. For this purpose, the union is the organization whose contract was involved or which has taken active leadership in the stoppage. Disputes involving more than one union are classified as jurisdictional or rival union disputes or as involving cooperating unions. If unorganized workers strike, a separate classification is used. For publication purposes, union information is presented by major affiliation of the union, i.e., AFL–CIO, or nonaffiliation such as "Independent," "single firm," or "no union."

(8) The assistance of *mediators*, either governmental or private, in the resolution of industrial disputes is recorded.

(9) The manner in which stoppages are *settled* involves classification into the following categories: (a) those ending with a formal settlement; (b) those terminating without a formal settlement, and those in which work is resumed with either the old or new workers; and (c) those concluded by the employer's decision to go out of business.

(10) A classification also is made of the manner in which *unsettled issues* are to be resolved in those situations where strikes are terminated with the understanding that such matters will be handled after the resumption of normal operations.

Presentation

Publications in the area of work stoppages include monthly preliminary estimates, annual reports, and special reports which are issued irregularly.

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[6] See appendix C.

[7] When a major change in the classification of issues was introduced in 1961, the Bureau included in its annual report for that year a method of linking the new classifications with the old.

Monthly preliminary estimates are issued approximately 30 days after the end of the month of reference in the form of press releases. Such reports presently are prepared for the first 10 months of each year, with a preliminary estimate of total strike activity during the year being issued a few days after the close of the calendar year.

Selected final tabulations of strike activity are presented in a release which usually is issued in June. An annual bulletin,[8] containing detailed information on the characteristics of work stoppages during the prior year, is published each winter.

Special reports containing historical work stoppage data by industry and area, or an analysis of a particular aspect of strikes, are issued irregularly. This latter category also may include Bureau reports of a nonstatistical nature, including chronologies of "national emergency" disputes arising under the terms of the Taft-Hartley Act.

Uses and Limitations

The use of strike statistics as an indicator of industrial unrest has been the traditional reason for their compilation in the United States and in other industrialized countries.[9] Whether they serve this elementary purpose today is open to question.[10] In any event, some qualifications must be taken into consideration in this use. The willingness of workers to strike as a protest against existing conditions may be encouraged or deterred by outside influences, such as the employment situation, the state of the business cycle, and possible political or public reaction. Within the plant, the strength of the union or of employer opposition may influence both the willingness of the workers to start a strike or to extend its duration.

Whether as a measure of industrial unrest or the state of labor-management relations, strike statistics are necessary for Federal, State, and municipal government agencies, particularly those concerned with labor affairs. Unions, employers, and employer associations use strike data to assess their own experiences, and business and civic organizations are concerned with their community promotional possibilities. Schools, particularly those teaching courses in industrial relations, and industrial relations counselors also find strike statistics useful. Finally, the press is interested, since strikes and information about them are newsworthy.

Although it is virtually certain that the Bureau is able to locate, and obtain information on, the larger work stoppages, some small strikes undoubtedly escape notice each year. While these omissions do affect data on number of strikes, the statistics on workers and man-days of idleness are virtually complete. As has been noted, the addition of new sources of information has not materially changed these latter figures, but these new sources have acted to lessen slightly the degree of comparability in the number of strikes reported from period to period. It follows that the narrower the classification of strike data, the greater is the chance of a significant omission. For example, while the figures for individual States may be taken as reasonably complete, the figures for a specific industry group within a State may be appreciably affected by the ommission of one strike.

Secondary idleness is not measured; that is, the figures do not cover those employees made idle in other establishments or industries as a result of material or service shortages resulting from a work stoppage. At times, the idleness of employees directly involved in a strike may be considerably less than the idleness of other workers brought about indirectly. No satisfactory method, however, has been found to measure or estimate such indirect effects adequately.

The Bureau does not attempt to measure the cost of strikes in terms of the amount of production and wages lost. The calculation of cost involves many complex and interrelated factors for which information is not readily available, including such matters as production schedules before and after the stoppage, diversion of output or services to other plants or employers, the flow of raw materials, and the amount of overtime worked before and after the strike.[11] The problem is magnified beyond statistical control if secondary costs are to be accounted for.

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[8] Since 1949, these bulletins have been titled *Analysis of Work Stoppages (year)*.

[9] For a discussion of the methods used in compiling strike statistics in other countries, see *Methods of Compiling Statistics of Industrial Disputes*, Geneva, International Labour Office, Studies and Reports, Series N, No. 9 (1926). See also A. M. Ross and P. T. Hartman, *Changing Patterns of Industrial Conflict*, New York, John Wiley & Sons (1960).

Data on work stoppages in other countries are published annually in the *Year Book of Labour Statistics*, Geneva, International Labour Office.

[10] See article by Joseph W. Bloch, "The Strike and Discontent," *Monthly Labor Review*, June 1963, pp. 645–651.

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[11] A framework for the measurement of the cost of strikes is developed by Neil W. Chamberlain and Jane Metzger Schilling in *The Impact of Strikes: Their Social and Economic Costs*, New York, Harper & Bros. (1954).

Technical References

Number

1. International Labour Office, *Methods of Compiling Statistics of Industrial Disputes*, Studies and Reports, Series N (Statistics), No. 9, Geneva (1926).
   Compares the methods used to compile statistics on industrial disputes, and outlines standards by which some degree of international comparability may be secured.
2. Peterson, Florence, "Methods Used in Strike Statistics," *Journal of the American Statistical Association*, pp. 90–95, 1937.
   Summarizes the definitions and methodology utilized by the Bureau of Labor Statistics in its work stoppage statistics program.
3. U.S. Department of Labor, Bureau of Labor Statistics, *Analysis of Work Stoppages (year)*.
   The Bureau of Labor Statistics issues annually a detailed statistical bulletin analyzing work stoppages in the United States.
4. ———. *Strikes in the United States, 1880 to 1936* (Bulletin 651, 1938).
   Contains a history of statistics on strikes and lockouts in the United States and major statistical data available from the earliest recorded date through 1936.

—EDWARD D. ONANIAN

Chapter 20. Collective Bargaining Agreements

Background

Collective bargaining agreements and related documents setting forth the provisions of employee-benefit plans provide a valuable source of information on industry wage practices, supplementary benefits, job and union security, the timing of wage negotiations, the nature of plant operations and working conditions, and many of the day-to-day aspects of employer-employee and union-management relationships.

The Bureau of Labor Statistics has utilized these basic industrial relations materials for public and Government informational purposes in three major ways, by: (1) maintaining a file of current agreements open to public inspection and inquiry; (2) preparing reports which reproduce representative agreement provisions or the variety of provisions relating to similar problems, or digests of selected identified agreements or benefit plans; and (3) by preparing studies measuring the prevalence and characteristics of specific types of agreement and benefit plan provisions or of other aspects of collective bargaining such as multiemployer bargaining.

The development of industrial relations practices that are now widely prevalent is reflected in the Bureau's studies over the years. The Bureau's interest in the collection and analysis of union agreements dates back almost 70 years.[1] Systematic efforts to collect agreements began in 1912. The first of a number of BLS bulletins devoted entirely to the subject of collective bargaining agreements appeared in 1925. A large number of reports and bulletins on a wide variety of industrial relations subjects have since been published.

The Bureau's responsibility in the field of agreement collection and analysis received additional sanction and guidance in the Labor Management Relations (Taft-Hartley) Act, 1947, section 211, which reads as follows:

> Sec. 211. (a) For the guidance and information of interested representatives of employers, employees, and the general public, the Bureau of Labor Statistics of the Department of Labor shall maintain a file of copies of all available collective bargaining agreements and other available agreements and actions thereunder settling or adjusting labor disputes. Such file shall be open to inspection under appropriate conditions prescribed by the Secretary of Labor, except that no specific information submitted in confidence shall be disclosed.
>
> (b) The Bureau of Labor Statistics in the Department of Labor is authorized to furnish upon request of the [Federal Mediation and Conciliation] Service, or employers, employees, or their representatives, all available data and factual information which may aid in the settlement of any labor dispute, except that no specific information submitted in confidence shall be disclosed.

Concepts and Scope

Although the substance of collective bargaining rests partly upon a foundation of unwritten industry, company, and union practices, and upon various legal requirements, the basic unit in agreement collection and analysis is the written agreement itself. The agreement may cover a single plant, a number of plants of a multiplant company, or a number of companies, in some cases over a thousand, bound together formally or informally in an association for collective bargaining purposes. It may express conditions of employment in simple terms, and leave much of the administrative details and other matters to the day-to-day relationships between the parties, or it may attempt to cover all details and, thus, leave as little as possible to later bargaining or haggling. Agreements vary in size from a few sheets to over 300 pages of a pocket-sized booklet. They reflect the diversity of employment conditions among industries and companies and of the scope of the issues over which bargaining takes place, as well as differences in the degree of precision sought and the language used.

Estimates of the number of agreements currently in effect range up to 155,000. The number of workers covered by agreements is estimated at about 20 million. The Bureau presently maintains a file of approximately

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[1] A bulletin of the Department of Labor, Number 42, September 1902, included this note: "It is the purpose of this Department to publish from time to time important agreements between large bodies of employers and employees with regard to wages, hours of labor, etc. The Department would be pleased to receive copies of such agreements whenever made." (p. 1057)

Between 1888 and 1903, the Bureau of Labor (now the Bureau of Labor Statistics) had independent status as a Department of Labor, under the direction of a commissioner.

6,500 current agreements in the private sector, covering about 9.8 million workers.[2] All industries are represented in the file except railroads and airlines. Since railroads and airlines are required to submit copies of agreements to the National Mediation Board, the Bureau does not attempt to collect these agreements.

As a result of the recent growth of collective bargaining in the public sector, the file has been expanded to include a variety of documents covering employees of the Federal Government, States, counties, cities, and special jurisdictions. These documents range from traditional collective bargaining agreements through memoranda of agreement to executive orders, administrative promulgations, and legislative actions, which are clearly the result of bilateral negotiations. The public file is growing daily, presently exceeds 1,000 documents at all government levels, and involves more than 1 million public employees.

The Bureau's quantitative analysis of agreement provisions covers virtually the entire range of issues dealt with in collective bargaining.[3] The basic assumption underlying such analysis is that the variety of subjects can be defined, classified, and counted.

In its general analysis of agreements, as distinct from special industry studies, the Bureau is concerned with these major objectives: (1) the presentation of data by industry group and for manufacturing and nonmanufacturing as a whole, (2) the presentation of data by region or union affiliation if the subject requires it, (3) a realistic measure of representativeness in the agreements studied, and (4) the study of practices which are (as yet) relatively uncommon in collective bargaining agreements. For agreements covering public employees, data are presented by the type of government activity (police department, veterans administration, etc.) and for cities, by population size.

Methods of Collection and Analysis

Collection of Agreements

The selection of agreements for the file is currently based on two guides: To enlarge to the fullest the opportunities for public and governmental use of the file,[4] and to provide a diversified collection of agreements for special reports, which the Bureau occasionally is called upon to prepare. The extent to which these objectives are fulfilled is obviously affected by the size of the file. A third guide—that of constructing a file which truly represents all public and private agreements and thus provides a firmer basis for sound generalizations on all agreements—has long been a goal of the Bureau.

The maintenance of a current file of agreements is a continuous undertaking because of two factors: (1) The typical agreement has a fixed duration, after which it is no longer considered current (unless notice of renewal without change has been received), and (2) submission of agreements to the Bureau is voluntary on the part of employers or unions. To allow for the ratification and the printing of new agreements, requests for copies are mailed about 2 or 3 months after the expiration date indicated in the previous agreement or upon other notice of contract change. As in other phases of the Bureau's work, the voluntary cooperation of employers and unions is of utmost importance. Any restrictions imposed by respondents on the public use of agreements are observed scrupulously by the Bureau.

To facilitate the use of the file in accordance with the types of requests customarily made, each agreement received is coded for a series of identifying features, which include union, location, number of workers covered, industry, and effective and expiration dates. For public employee documents, the level of government and the government activity also are coded.

Agreement Analysis

The Bureau's utilization of the private sector agreements it collects has moved through different stages over the years, in pace with, or controlled by, the increasing prevalence and maturity of collective bargaining. During the early years, significant agreements were reproduced in their entirety. As collective bargaining spread, and the size and representative character of the Bureau's file increased, attention was directed towards reproducing and analyzing the variety of agreement clauses relating to similar subjects, culled from a large number of agreements. Although illustrative clauses continue to be utilized in most of the Bureau's agreement studies, major emphasis during recent years has been devoted to measuring the prevalence and characteristics of particular provisions and of types and levels of benefits. The Bureau's Bulletin 1425 series represents its most comprehensive efforts to date. The Bureau also has undertaken a broader, more extensive rather than intensive analysis, in which it searches the agreement to measure the prevalence, but not the detailed characteristics of more than 100 different collective bargaining provisions. In these kinds of analysis, problems relating to techniques of coding and analysis come to the fore.

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[2] During the early postwar period, the number of agreements on file exceeded 12,000.

[3] See Program Note by Joseph W. Bloch, "Union Contracts—A New Series of Studies," *Monthly Labor Review*, October 1964, pp. 1184–1185.

[4] The agreements file is located in the Washington Office of the Bureau's Division of Industrial Relations. Agreements submitted to the Bureau with a stipulated limitation on public use are not available for inspection. Requests for information concerning specific agreements or agreement clauses are accommodated, depending upon the nature of the request, within the limits of staff resources.

In 1948 and 1949, when the Bureau's file consisted of more than 12,000 agreements, it was decided that a sample of 3,000 agreements would be feasible. The selection of specific agreements was based on a number of factors, including industry, agreement coverage, location, union representation, and bargaining practices. Limited data upon which to base a representative selection of agreements were compensated for, at least in part, by extensive experience with collective bargaining practices on the part of the sample selectors.

During subsequent years, however, available staff resources were not sufficient to deal with a sample of this size. The feasibility of reconstituting a sample of 1,500 to 2,000 agreements, which had become the maximum work load, and of assuring appropriate safeguards against deterioration, was rejected as being beyond the resources of the staff and the available data. The most advantageous alternative was to base the private industry agreement studies on all agreements covering 1,000 workers or more and, thus, to avoid sampling. The Bureau's file already contained almost all of these; the Bureau's monthly report, *Current Wage Developments*, was a ready source of information on those that were not included. The total number of workers covered by agreements of this size (now between 1,700 and 1,900) is about 7.7 million and represents a very substantial worker coverage in agreement studies. The number of establishments covered is not known.[5]

A key analysis list containing all private industry agreements covering 1,000 or more workers, although perhaps not the ideal coverage, has definite advantages: (1) It achieves maximum worker coverage in the studies for a given investment of staff resources; (2) it provides a simple, objective measure of the coverage of the studies; (3) it permits the presentation of various combinations and breakdowns of the data without the necessity of complicated weighting schemes and without the bias resulting from the lack of proper weighting; (4) it is safeguarded against obsolescence, since the Bureau is best able to keep abreast of changes in agreements of this size; and (5) it has a significant meaning to users of these studies.

The distinguishing feature of agreement analysis is that it deals mainly with legal language, which requires interpretation, rather than with numbers or other universal, sharply defined attributes. The process of analysis consists of interpreting provisions, reducing them to numbers (codes), aggregating the numbers, and converting the aggregates back to types of provisions and prevalence. Data are presented in terms of number of agreements and number of workers covered. Since agreement provisions on the whole are notable more for their variety of expression and details than for their uniformity, the process of analysis becomes a simplification process by which some of the original content and variety is lost. Under such circumstances, the planning of studies acquires a special importance if significant differences are not to be buried.

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[5] The distinction between size of agreement (employees covered) and size of establishment is important. A substantial proportion of these agreements are association negotiated and cover a large number of small establishments. Two agreements, for example, involving the United Mine Workers (IND.), cover most of the anthracite and bituminous coal mines in the country. Some association agreements in New York State cover more than a thousand firms.

The keystone of agreement analysis study is obviously the interpretation of the agreement and the assignment of the predetermined code number. For some subjects, an agreement must be read in its entirety; for others, only a portion. Long and legal provisions must be reduced to their essentials. Since the interpretation of agreement provisions is often a troublesome matter for the parties themselves (as reflected in the widespread adoption of provisions for arbitration), misinterpretations undoubtedly occur. These are kept to a minimum by a staff experienced in agreement analysis and by continuous efforts to assure consistency of interpretations.

Uses and Limitations

The studies of agreement provisions are of practical use to public and private employers and unions engaged in collective bargaining, to arbitrators and factfinding boards, to administrators of company wage and industrial relations programs, and to legislators and Government officials. Persons not directly involved in collective bargaining or in related administrative activities (e.g., teachers and students of labor problems, writers for newspapers and trade and technical journals, and foreign observers) find value in the broader aspects of employer-employee relationships revealed in these studies.

The limitations of these studies of agreement provisions and employee-benefit plans are determined, in large part, by their application. For studies of paid holiday provisions or other supplementary benefits, the fact that these studies cover only the area of collective bargaining may constitute a limitation on generalizations applying to all workers but not necessarily on their uses in collective bargaining or in wage and employee administration. On the other hand, these studies do not show locality practice, which may reduce their usefulness for some collective bargaining purposes but not for broad generalizations relating to workers under collective bargaining.

Additional limitations of agreement provision studies are inherent in the selection of agreements for study—the exclusion of railroad and airline agreements and of agreements covering fewer than 1,000 workers—and in the technique of analysis, as indicated previously. Limitations are also connected with the particular subjects studied, which are pointed out in each study. A fundamental limitation which must be borne in mind in connection with certain studies (e.g., grievance procedure) is that they relate to written policy rather than actual practice. Practices which are not provided for in the agreements but are, instead, matters of company policy going beyond the agreement, traditional industry policy, informal acceptance by management and unions, or arbitrators' decisions, can be neither detected nor measured in agreement analysis.

Technical References

Number

1. Bloch, Joseph W. *Union Contracts*—A New Series of Studies. *Monthly Labor Review*, October 1964, pp. 1184–1185.
2. U.S. Department of Labor, Bureau of Labor Statistics, *Major Collective Bargaining Agreements* (Bulletin 1425 Series).
    - 1425–1, 1964: Grievance Procedures
    - 1425–2, 1965: Severance Pay and Layoff Benefit Plans
    - 1425–3, 1965: Supplemental Unemployment Benefit Plans and Wage-Employment Guarantees
    - 1425–4, 1966: Deferred Wage Increase and Escalator Clauses
    - 1425–5, 1966: Management Rights and Union-Management Cooperation
    - 1425–6, 1966: Arbitration Procedures
    - 1425–7, 1969: Training and Retraining Provisions
    - 1425–8, 1969: Subcontracting
    - 1425–9, 1969: Paid Vacation and Holiday Provisions
    - 1425–10, 1969: Plant Movement, Transfer, and Relocation Allowances
    - 1425–11, 1970: Seniority in Promotion and Transfer Provisions
    - 1425–12, 1970: Administration of Negotiated Pension, Health, and Insurance Plans
3. ______. Bulletin 1353, *Major Union Contracts in the United States, 1961* (1962).
4. ______. Bulletin 1686, *Characteristics of Agreements Covering 5,000 Workers or More* (1970).

—JOSEPH W. BLOCH

Chapter 21. Union Membership

Background

The Bureau of Labor Statistics' interest in union membership as a significant social and economic indicator is of long standing. The first BLS publication listing membership figures for national and international labor unions in the United States was probably the *Handbook of American Trade-Unions,* issued in 1926 (BLS Bulletin 420), followed by a similar publication in 1929 (BLS Bulletin 506) and an extensive revision in 1936 (BLS Bulletin 618). The *Handbooks,* however, devoted little space to overall membership figures or trends; their main emphasis was on the origins and early history of particular unions, their government and structure, trade jurisdiction, and types of beneficial activities.

In 1939, on a modest scale, the Bureau began to publish an annual trade union directory, but it was not until 1948 (Bulletin 937) that the listing of union officers, headquarters' addresses, etc., was supplemented with an entry for each union on membership and number of local unions, and a compilation of total membership. In subsequent years the information sought from national and international unions has expanded considerably. Data on women members first appeared in the 1953 *Directory,* and separate tabulations for areas outside the United States (Canada, Puerto Rico, etc.), in the 1955 edition. Since 1957, each *Directory* has carried information on the number and proportion of members who are white-collar workers and on those in major industry groups. State figures were introduced on a limited basis in 1959, when AFL–CIO central bodies were asked to furnish estimates on the number enrolled by Federation affiliates. In its 1965 *Directory,* the Bureau showed State figures as reported by national and international unions. Many of the items referred to have been refined since they were first introduced, and the accumulated information now permits analysis of trends in total membership and several of its components.

Data Sources and Collection

For part of the Bureau's biennial *Directory of National and International Labor Unions in the United States,* unions meeting the criteria noted are asked to report the average number of dues-paying members or the number of members in good standing for the 2 most recent years, including members outside the United States; the proportion of white-collar and women members; breakdowns by major industry and by State, and other membership information. (See copy of questionnaire on pp. 188–191.) To be included in the *Directory,* a union must be an affiliate of the AFL–CIO or, in the case of unaffiliated unions, a party to collective bargaining agreements with different employers in more than one State. Among the unions in the latter category are such unaffiliated unions as the Teamsters, the Mine Workers, and the Auto Workers. In addition, the *Directory* accounts for all unions of Federal Government employees that have received "exclusive recognition" as specified in Executive Order 11491. Thus, by definition, the Bureau excludes from its *Directory* those unions whose activities are confined to a single locality or to a single employer.[1] Although the Bureau sends questionnaires to all multilocal unions who have submitted reports to the U.S. Department of Labor's Office of Labor-Management and Welfare-Pension Reports, as required by the Labor-Management Reporting and Disclosuere Act,[2] possibly some small unaffiliated unions, interstate in scope, escape attention. These inadvertent omissions do not affect membership totals in any significant way.

When some unions are unable to furnish information for one or more of the questionnaire items, estimates are derived from other sources on file, notably union periodicals, convention proceedings, financial statements, and collective bargaining agreements. No sampling procedures are used; the data are based on the

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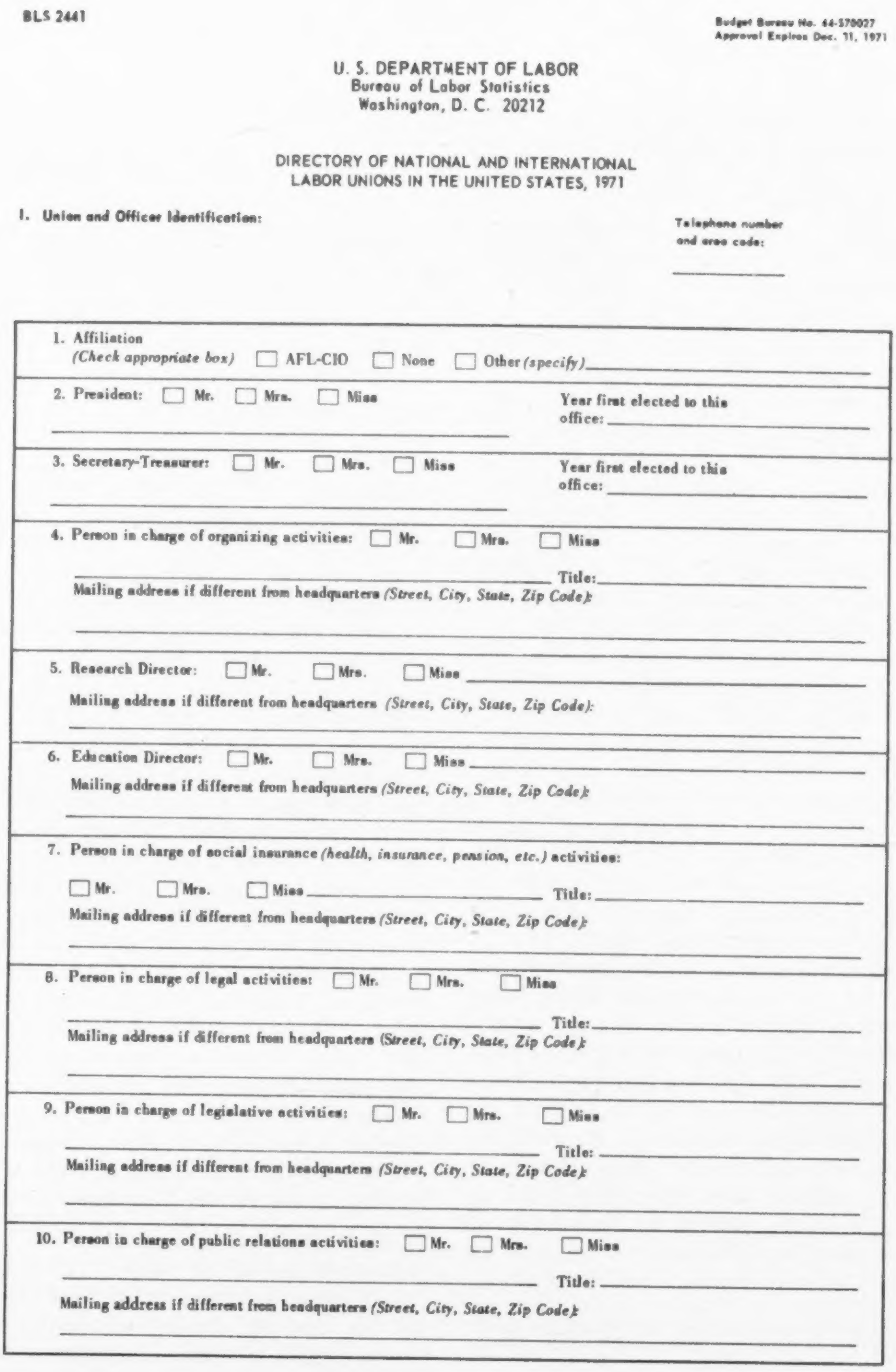
[1] For a membership survey of these unions see *Unaffiliated Intrastate and Single-Employer Unions, 1967* (BLS Bulletin 1640, 1969).

[2] The names of all reporting unions appear in the Department's *Register of Reporting Labor Organizations,* last issued in 1968.



BLS 2441

Budget Bureau No. 44-S70027
Approval Expires Dec. 11, 1971

U. S. DEPARTMENT OF LABOR
Bureau of Labor Statistics
Washington, D. C. 20212

DIRECTORY OF NATIONAL AND INTERNATIONAL
LABOR UNIONS IN THE UNITED STATES, 1971

I. Union and Officer Identification:

Telephone number and area code: ____________

1. Affiliation *(Check appropriate box)* ☐ AFL-CIO ☐ None ☐ Other *(specify)* ____________

2. President: ☐ Mr. ☐ Mrs. ☐ Miss ____________ Year first elected to this office: ____________

3. Secretary-Treasurer: ☐ Mr. ☐ Mrs. ☐ Miss ____________ Year first elected to this office: ____________

4. Person in charge of organizing activities: ☐ Mr. ☐ Mrs. ☐ Miss
____________ Title: ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

5. Research Director: ☐ Mr. ☐ Mrs. ☐ Miss ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

6. Education Director: ☐ Mr. ☐ Mrs. ☐ Miss ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

7. Person in charge of social insurance *(health, insurance, pension, etc.)* activities:
☐ Mr. ☐ Mrs. ☐ Miss ____________ Title: ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

8. Person in charge of legal activities: ☐ Mr. ☐ Mrs. ☐ Miss
____________ Title: ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

9. Person in charge of legislative activities: ☐ Mr. ☐ Mrs. ☐ Miss
____________ Title: ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

10. Person in charge of public relations activities: ☐ Mr. ☐ Mrs. ☐ Miss
____________ Title: ____________
Mailing address if different from headquarters *(Street, City, State, Zip Code)*: ____________

II. Conventions and Publications:

1. Frequency of conventions: ☐ Annual ☐ Semi-annual ☐ Biennial ☐ Other *(specify)*__________

2. Next convention: __________ Month Day Year __________ *(City, State)*

3. Name of official publication(s)

Name of official publication(s)	How often published	Editor

III. Affiliated Bodies:

Indicate number of locals in operation at the end of 1970__________

IV. Membership:

1. Indicate annual average dues-paying membership count for 1969 and 1970. If complete returns for 1970 are not available, use 9 or 10 month average:

1969 __________ members 1970__________ members

2. If your records do not permit an annual average dues-paying membership count, please indicate the number of members in good standing or those carried on your rolls:

1969__________ members 1970__________ members

3. Indicate if retired members are included in 1 or 2 above: ☐ Yes ☐ No
If yes, indicate number of retired members included: __________ members

V. Classification of 1970 membership:

1. Indicate approximate percentage of membership who are women: __________ %
(if none, enter zero)

2. Indicate approximate percentage of membership in the following "white-collar" categories:

Professional and/or technical _____ %
Clerical ------------------ _____ %
Sales--------------------- _____ %
Total "white-collar"- ----- _____ %
(if none, enter zero)

3. Industry composition of union membership. Indicate the approximate percentage of all union members working in establishments in each of the following industry groups:

Manufacturing:

Ordnance and accessories ---------- _____ %
Food and kindred products *(incl. beverages)* ---------- _____ %
Tobacco manufactures ---------- _____ %
Textile mill products ---------- _____ %
Apparel and other finished products made from fabrics and similar materials ---------- _____ %
Lumber and wood products, except furniture ---------- _____ %
Furniture and fixtures ---------- _____ %
Paper and allied products ---------- _____ %
Printing, publishing and allied industries ---------- _____ %
Chemicals and allied products ---------- _____ %
Petroleum refining and related industries ---------- _____ %
Rubber and misc. plastics products ---------- _____ %
Leather and leather products ---------- _____ %
Stone, clay, glass, and concrete products ---------- _____ %
Primary metals industries ---------- _____ %
Fabricated metal products, except ordnance, machinery and transportation equipment ---------- _____ %
Machinery, except electrical ---------- _____ %
Electrical machinery, equipment and supplies ---------- _____ %
Transportation equipment ---------- _____ %
Professional, scientific and controlling instruments; photographic and optical goods, watches and clocks ---------- _____ %
Miscellaneous manufacturing industries ---------- _____ %

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V. Classification of 1970 membership: *(Continued)*

3. Indicate industry composition of union membership ....

Nonmanufacturing:

Mining and quarrying *(including crude petroleum and natural gas production)* ------------------ ______ %
Contract construction *(building and special trade)* ------------------ ______ %
Transportation services *(including railroads, air, bus, truck and water transportation, and allied services)* ------------------ ______ %
Telephone and telegraph ------------------ ______ %
Electric, gas, and sanitary services *(including water)* ------------------ ______ %
Wholesale and retail trade ------------------ ______ %
Finance, insurance and real estate ------------------ ______ %
Service industries *(including hotels, laundries and other personal services, repair services, motion pictures, amusements and related services, hospitals, educational institutions, non-profit membership organizations)* ------------------ ______ %
Agriculture and fishing ------------------ ______ %
Nonmanufacturing *(classification not available)* ------------------ ______ %
______ %

Government:

Federal ------------------ ______ %
State and local ------------------ ______ %
______ %
Total ------------------ 100 %

4. State distribution of union membership. Indicate the approximate number or percentage of members in each of the 50 States.

Alabama ------------ ______
Alaska ------------ ______
Arizona ------------ ______
Arkansas ------------ ______
California ------------ ______
Colorado ------------ ______
Connecticut ------------ ______
Delaware ------------ ______
Florida ------------ ______
Georgia ------------ ______
Hawaii ------------ ______
Idaho ------------ ______
Illinois ------------ ______
Indiana ------------ ______
Iowa ------------ ______
Kansas ------------ ______
Kentucky ------------ ______
Louisiana ------------ ______
Maine ------------ ______
Maryland--District of Columbia ------------ ______
Massachusetts ------------ ______
Michigan ------------ ______
Minnesota ------------ ______
Mississippi ------------ ______
Missouri ------------ ______
Montana ------------ ______
Nebraska ------------ ______
Nevada ------------ ______
New Hampshire ------------ ______
New Jersey ------------ ______
New Mexico ------------ ______
New York ------------ ______
North Carolina ------------ ______
North Dakota ------------ ______
Ohio ------------ ______
Oklahoma ------------ ______
Oregon ------------ ______
Pennsylvania ------------ ______
Rhode Island ------------ ______
South Carolina ------------ ______
South Dakota ------------ ______
Tennessee ------------ ______
Texas ------------ ______
Utah ------------ ______
Vermont ------------ ______
Virginia ------------ ______
Washington ------------ ______
West Virginia ------------ ______
Wisconsin ------------ ______
Wyoming ------------ ______
No. or percentage not accounted for in the U.S. ------------ ______

5. For any area outside the United States, please indicate the number of dues-paying members and the number of local unions in existence as of the end of 1970 or any other appropriate current period:

Location	Approximate number of union members	Number of local unions
Canada --------------------	______	______
Puerto Rico ---------------	______	______
Canal Zone ----------------	______	______
Other *(specify)* -------------	______	______
______	______	______

- 4 -

VI. Term of Officers:

1. Are officers required to retire at a specified age?

National officers: ☐ Yes ☐ No; If yes, age ______

Local officers: ☐ Yes ☐ No; If yes, age ______

2. Are the number of terms an officer may serve limited?

National officers: ☐ Yes ☐ No; If yes, number of terms ______

Local officers: ☐ Yes ☐ No; If yes, number of terms ______

VII. Collective Bargaining Agreements:

1. Indicate the number of basic collective bargaining agreements with employers. Exclude supplemental and pension, health and insurance agreements:

Total ______ agreements.
United States ______ agreements.

2. (a) Indicate number of different employers covered by collective bargaining agreements ------------------- ______ employers
United States only ----- ______ employers

(b) If more than one employer, are the employers located in at least two States? ---------------------- ☐ Yes ☐ No

3. Indicate the number of workers covered by these agreements. Include nonmembers in the bargaining units:

Total ______ workers.
United States ______ workers.

4. Indicate the number of agreements in the United States that:

Expired in 1970 ______ agreements.
Will expire in 1971 ______ agreements.

5. Indicate the number of agreements in the United States that provide a wage reopener in:

1970 ______ agreements.
1971 ______ agreements.

VIII. Union Staff:

Indicate the number of full-time employees on the payroll of the national in the United States. Exclude elected officials and employees on the payrolls of local unions and intermediate bodies:

Managers and administrators ------------- ______
Professionals ------------------------- ______
Clerical and secretarial ---------------- ______
Organizers and representatives ---------- ______
Others *(specify)* ---------------------- ______

May we have your comments regarding the present Directory and proposals for changes in future editions?

____

Name of person reporting Title Date

entire universe of national and international unions, as defined.

Presentation

The data for each union and summaries are presented in the *Directory* and in articles in the *Monthly Labor Review*. Wherever appropriate, separate data are presented for AFL–CIO affiliates and unaffiliated unions and cover questionnaire items such as total membership for the last 2 years, members in and outside the United States, size of unions, women and white-collar members, and industry distribution. Gains and losses over the past decade are analyzed, and major unions are ranked according to size at particular points in time. Of considerable interest to users of the *Directory* are the changes of union membership related to changes in the total labor force and to employees in nonagricultural establishments. Data by industry and on women and white-collar members permit rough approximations on the extent of union penetration compared with earlier periods.

In addition to statistical summaries, the *Directory* also contains appendixes which list, for each union, membership in areas outside the United States, number of women, proportion of white-collar members, and proportion of members in major industry groups.

Uses and Limitations

The Bureau's membership figures are published on a regular basis, and serve as the principal indicator of gains and losses for particular unions and for the labor movement as a whole, particularly as a measure of inroads or declines in industry and occupational groups. Comparisons of labor relations policies and their economic effects can be made between organized and unorganized sectors. They are used by agencies of the Federal Government, State and local governments, by management personnel, union officials, students of the labor movement and economic affairs, and the general public. The *Directory* also is distributed widely abroad, notably to international organizations and labor unions.

Difficulties in measuring union membership arise from (1) the variety of concepts and practices among unions as to the definition and reporting of membership, (2) the availability at union headquarters of the various data requested, and (3) the willingness of the unions to make those data available to outsiders.

In an attempt to achieve uniform reporting practices, the Bureau asks unions to report on the annual average number of dues-paying members. Although a worker when joining a union assumes an obligation to pay dues, uniform reporting practices do not result from applying this criterion alone. Unions define eligibility for membership in a variety of ways and payment of dues is only one of several criteria. Some unions set less than full dues requirements or waive the payment for workers who are unemployed or on strike. Such exonerated workers, however, usually remain members in good standing, with the same rights as full dues-paying members. Similar qualifications may apply to members who are apprentices, retired, or in the Armed Forces.[3]

In an attempt to determine union practices in reporting membership, the Bureau repeatedly has requested unions to indicate whether they include or exclude from membership reports five specified groups: the unemployed; those involved on work stoppages; those in the Armed Forces; apprentices; and the retired. Moreover, unions were asked to furnish an estimated or actual figure on the number of members in "excluded" categories. Ideally, if all unions could furnish such data, it would be possible to compute the total number of workers who, at least in some way, are still attached to unions. The responses, however, have fallen far short of this goal. Only a small number of unions reported, in whole or in part, the practices they followed. An even smaller number of unions were able to furnish figures on the number of workers involved.[4]

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[3] In its 1963 *Directory*, the Bureau took a closer look at the relationship between dues submitted to the international union, the so-called per capita tax, and reported membership totals for particular unions. Per capita tax receipts were divided by the per capita tax rate. Briefly, the findings indicated that while a number of unions use a "per capita" receipt figure in their reports to the Bureau, such an approach was inappropriate in the case of other unions for reasons which the unions explained in detail. Some unions include a large number of seasonal employees whose dues payments are limited to several months during the year. Other unions questioned the use of a computed membership figure where for large groups of workers (sick, unemployed, those promoted out of the bargaining unit, etc.) only a partial per capita tax is paid, at times less than one-tenth of the amount required of other members. A few unions indicated categories of members completely dues exempt (e.g., life members, 50-year members, etc.). Financial obligations also frequently are waived for workers recently organized and for local unions in economic difficulties. In addition, several unions set dues on a sliding scale proportionate to the income of members, a method which rules out computations of this sort. Thus, on examination it became clear that computing membership by dividing the tax rate into tax receipts could not be used as a uniform yardstick applicable for all unions.

Thus, no uniform answer exists to the deceptively simple question: Who is a union member? The answer varies from union to union, as determined by its own policies and practices.

Although financial statements may be of some help in arriving at membership approximations, they cannot be used to obtain data on various components of union membership, such as the proportion of white-collar and women members, those under contract in particular industries, etc. For such data, the Bureau must rely entirely on the cooperation of national unions. These, however, are not always able to furnish the information for the simple reason that it is not compiled at union headquarters. Many national unions are decentralized organizations and as a rule, do not seek reports on these items from their local unions. Also, some unions in possession of such information may be reluctant to make it public.

Data presently compiled are submitted by officials of national and international unions. Perhaps more accurate data, and certainly more detailed data, could be obtained by contacting local unions, as is done in Canada, but the task of soliciting responses from more than 70,000 organizations is beyond the present resources of the Bureau.

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[4] At various times, suggestions have been made on the use of alternative sources for membership information, notably the use of "voting strength" of international unions at AFL-CIO conventions, based upon average paid membership to the Federation. This, however, is not a reliable measure. Some unions, for reasons of prestige, tend to overpay, while others, as a matter of convenience, pay an arbitrary amount. Moreover, this method could not be used for unions outside the AFL-CIO.

Technical References

Number

1. Troy, Leo. *Distribution of Union Membership Among the States, 1939 and 1953.* New York, National Bureau of Economic Research, 1957.

   A study measuring union growth by State and region, analyzing geographic and industrial shifts in membership. Includes a discussion of sources and methods of measurement.

2. U.S. Department of Labor, Bureau of Labor Statistics. "Membership of Labor Unions, 1897–1950." *Handbook of Labor Statistics*, 1950 ed., (Bulletin 1016, 1951), pp. 137–139.

3. ——. *Directories of Labor Unions in the United States;* (Bulletins 937, 1948; 980, 1950; and 1127, 1953).

4. ——. *Directories of National and International Labor Unions in the United States* (Bulletins 1185, 1955; 1222, 1957; 1267, 1960; 1320, 1962; 1395, 1964; 1493, 1966; 1596, 1968; and 1665, 1970). In various articles in *Monthly Labor Review.* (Excerpted)

   In addition to membership data, the *Directories* also include a brief description of the methods used, and a copy of the questionnaire.

5. Paschell, William, "Limitations of Union Membership Data," *Monthly Labor Review*, November 1955, pp. 1265–1269.

6. Wolman, Leo. *Ebb and Flow in Trade Unionism*, New York, National Bureau of Economic Research (1936).

   Of invaluable aid to students in the field because of its extensive discussion of measurement problems. Appendix tables present figures for the period 1900 to 1934 including data on the extent of organization by industry.

7. U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, Series P-20, No. 216, "Labor Union Membership in 1966" (1971).

   The first comprehensive study giving economic and demographic data for union and nonunion private wage and salary workers.

—HARRY P. COHANY

Chapter 22. Annual Earnings and Employment Patterns of Private Nonagricultural Workers

Background

The purchasing power of workers depends largely on their annual earnings which are determined by the interaction of variables such as straight-time rates of pay, number of hours worked, and the hours worked at premium rates which depend on other variables like occupation, union status, industry, and area. Moreover, some workers move into and out of the labor force during the year. In addition, a substantial portion work for more than one employer in the same industry and for one or more employers in different industries. Consequently, occupational wages or hourly and weekly earnings data cannot be extrapolated to annual earnings estimates with any degree of precision.

The Bureau's program of annual earnings and employment patterns studies, initiated in the late 1960's, is designed to fill the gap in our knowledge of annual wage and salary earnings from private nonagricultural employment. The first study[1] for 1964, was limited to wage and salary earnings covered by social security; the second,[2] for 1965, included data on wage and salary earnings covered under either the Social Security Act or the Railroad Retirement Act. Subsequent studies, like that for 1965, will include information on earnings covered under either social security or railroad retirement. Bulletins providing 2 years of data are expected to be issued biennially. Special analytical studies will be published intermittantly in the *Monthly Labor Review.*

Description of the Series

The series covers earnings and employment patterns in the private, nonagricultural sector which, broadly defined, includes individuals who work for wages and salaries in employment covered by the Social Security Act and the Railroad Retirement Act.[3] Excluded are earnings in agriculture, self-employment, and in government units other than those that participate in social security and function like private firms, such as hospitals and schools.

The studies provide distributions of median and mean earnings for the private nonagricultural sector as a whole, for each industry division, for each major industry group at the two-digit SIC level, and for selected industry groups at the three-digit SIC level of industry classification. The data, though available only for white-collar and blue-collar workers combined, are unique, because unlike annual earnings data from other sources, they permit an analysis of the distribution of wage and salary earnings and employment patterns by industry and quarters of employment.

The studies focus separately on earnings in the industry in which workers had greater earnings than in any other, and earnings in all industries. Some of these data and some of the employment patterns data, separately and with earnings data, also are presented for selected demographic characteristics.

Earnings and employment patterns of workers who had covered wage and salary each quarter of the year are emphasized particularly. Information about earnings and employment patterns of four quarter workers is the closest to data for workers fully attached to the private sector work force that can be obtained from the source materials. However, some workers who have earnings in each quarter are attached to the work force to only a limited extent.

Source of Data

The data are developed by the Bureau of Labor Statistics from statistical information

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[1] *Annual Earnings and Employment Patterns, Private Nonagricultural Employment, 1964* (BLS Report 330 1969).

[2] *Annual Earnings and Employment Patterns of Private Nonagricultural Employees, 1965* (BLS Bulletin 1675, 1970).

[3] For a discussion of the interrelationship of, and joint coverage under, the railroad retirement and social security systems, see U.S. Department of Health, Education, and Welfare, Social Security Administration, *Social Security Handbook*, 4th ed. (1969), and U.S. Railroad Retirement Board, *Handbook on Railroad Retirement and Unemployment Insurance Systems* (1969).

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obtained from the Social Security Administration and the Railroad Retirement Board. To preserve the confidentiality of the records, the data are provided to the Bureau of Labor Statistics without identification of individuals or employers. However, to combine data from various employments and to facilitate statistiscal processing, each individual and employer is assigned a permanent control number, different from his social security or employer identification number.

Each individual in the sample provides demographic information (race, sex, and year of birth) when he applies for a social security number. Each employer under social security from whom the individual receive any wages or salaries during a calendar quarter reports the amount of the wage payment in the quarter; employers covered under railroad retirement .report monthly. However, employers, cease to report wage and salary earnings after the worker has reached his taxable earnings limit in that employment situation. Employers report wages paid to the maximum annual limit under social security and to the maximum monthly limit under the railroad retirement system. Employer reports also indicate the industry and, except for employment covered by the Railroad Retirement Act (RRA), the area in which the wages or salaries were earned. Employers subject to the RRA, also provide information about the occupational category the worker was employed in.

Sample Design, and Sampling and Nonsampling Variability

The sample, which includes 1 percent of all social security numbers, was selected on the basis of a multistage systematic cluster sampling procedure. Social security numbers are used as the individual's identification number in both the social security and railroad retirement systems. An individual selected for the sample remains in it permanently.[4]

Since estimates in this study are based on a sample, they may differ from census figures. Moreover, the sample data are not adjusted to benchmark levels established by complete counts. In addition, the data are subject to nonsampling variability due to errors in reporting and classification and other possible error sources, that would be present in a complete enumeration as well as in a sample. As a result, ratios established from the sample data are considered to be reasonable estimates of those existing within the population as a whole. Nevertheless, particular care should be exercised in interpreting medians and percents based on relatively small numbers of cases as well as small differences between figures.[5] Absolutes are subjct to large error which may vary from year to year.

Estimating Procedures

To estimate total wages of individuals, the Social Security Administration determines the quarter in which the taxable limit is reached ("limit quarter"). Wages in the prior quarter equal to or greater than the "limit quarter" wages are substituted for those in the "limit quarter" and in all subsequent quarters. Limit quarter earnings, however, are used to estimate earnings in the limit and subsequent quarters if limit quarter earnings were higher than earnings in previous quarters. The summation of the quarterly wages after these substitutions then becomes the estimated annual total. When the taxable limit is reached in the first quarter, the Social Security Administration imputes an estimated total.

Employers covered by the Railroad Retirement Act are required to provide information about the monthly earnings of each employee up to the maximum creditable limit subject to Railroad Retirement Act taxes. Hence, even earnings reported at the maximum level for each month aggregated to annual totals may be substantially below the worker's total earnings. The Railroad Retirement Board, however, collects information from employer records about the total annual earnings of a sample of workers covered by the act. Factors for raising creditable compensation under the Railroad Retirement Act to total railroad earnings are derived by comparing the total earnings data for individuals collected in the special study with the aggregated monthly earnings data for the same individuals. The incremental factors for workers in the same broad occupational categories then are averaged. The resulting factors, developed by the Railroad Retirement Board, are applied by the Bureau of Labor Statistics to the credited monthly earnings of each individual by taking into account his occupational category.[6]

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[4] For a detailed discussion of the sampling procedure, reporting criteria, and coverage under the social security and railroad retirement systems, see U.S. Department of Health, Education, and Welfare, Social Security Administration, *Workers Under Social Security, 1960* (1968) and *Social Security Handbook*, op. cit.; also see *Handbook on Railroad Retirement and Unemployment Insurance Systems*, op. cit.

[5] For an indication of the order of magnitude of the sampling errors and a fuller discussion of the sampling and non sampling variability to which the series is subject, see *Workers Under Social Security, 1960*, op. cit.

Analysis and Presentation

Distributions of workers by annual earnings, and mean and median earnings are presented for all major earners and for those with four quarters of earnings. In addition, data are provided showing the number of workers who had wage and salary earnings in the various industries and the proportion of these who had greater (major) earnings in that industry than in any other industry. Data on major earners by industry showing the proportion with earnings in each quarter, their demographic characteristics, what proportion had earnings within a single industry and the number of employers whom they worked for also are presented. Some earnings and employment patterns data are presented for broad geographic areas.

Terms used in the series and the methods used to classify workers by industry and region of major earnings and the industrial classification scheme used in classifying nonpolicy governmental units in scope of the study program are described below.

Annual earnings are defined as gross wages, salaries, and other payments (such as bonuses) received by employees, before deductions, in employment covered under the Social Security Act or the Railroad Retirement Act. Such payments may be cash, cash equivalents, or other media such as goods, clothing, board, or lodging.

Self-employment earnings, payment for work in employment excluded from the coverage of the acts, and payment for work in agriculture, in covered governmental units engaged in public administration and for military service have been excluded from this study. Most payments by employers to or on behalf of employees, or for employees and their dependents for retirement, death, sickness or accidental disability, or medical and hospitalization expense under provisions of a plan or system meeting certain general criteria, and employer payments to a trust fund, such as a pension trust, exempt from tax under the Internal Revenue Code, are not counted as wages in this series.[7]

Workers with some earnings in the industry. Each individual who earned $1 or more in an industry during the year is counted in each industry in which he had any earnings. A worker who had some earnings in each of five three-digit industries, as defined in the *Standard Industrial Classification Manual*[8] for example, is counted for each of these industries as well as in each two-digit industry and in each division of which the three-digit industres are a part. Because a worker is counted in each three-digit industry, each two-digit industry and in each division in which he had $1 in covered wage and salary earnings or more, the aggregate count at each level is greater than the total number of workers at each broader industry level (two-digit, division, private nonagricultural economy).

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[6] Although the Railroad Retirement Board collects annual earnings data for a 1-percent sample of workers, the sampling criteria differ from those used by the Social Security Administration. To permit the combination and integration of data from the two systems, the Railroad Retirement Board provides the Bureau of Labor Statistics with data for a sample of workers selected according to the sample design established by the Social Security Administration.

[7] Under certain circumstances tips are counted as wages for social security purposes and thus are included in the data file used in this study series. Payments to workers from tax exempt trust funds are not considered wages (except for wages paid by the fund to its employees) and thus are excluded. Employer payments to trust funds which are not tax exempt also are excluded. Depending on their nature and purpose, payments to workers from these funds may be counted for social security purposes and thus are included in the data file.—Such would be the case if the payment was a bonus or vacation payment. For a more detailed discussion of covered wages, see the *Social Security Handbook*, op. cit.

[8] Issued by the U.S. Office of Management and Budget.

Major earners and industry of major earnings. A major earner in this study, is a worker who earns more of his annual wages and salaries in a specific industry than in any other industry. This test to determine the worker's industry of major earnings is based on a plurality earnings concept and is applied separately at each industry level.

Data for major earners are included in only one industry at each level in industry classification (i.e., at the three-digit, the two-digit, and at the divisional levels). Thus, the number of workers who received the major proportion of their earnings in each industry, at any level of industry classification, is unduplicated. Hence, data for any level of classification at which all component industries are shown add to the total for the private nonagricultural sector. However, data at the three-digit level (if all three-digit industries were shown) might not add to the detail at the two-digit level, and data at the two-digit level might not add to the divisional level. Except for totals at the private nonagricultural sector, this nonadditive relationship exists because some workers shift employment several times during the year and bring about patterns like that shown in the following tabulation of a hypothetical worker's employment and quarterly earnings experience.

	Total (any quarter)	*January to March*	*April to June*	*July to September*	*October to December*
Private nonagricultural economy	$530	$80	$130	$150	$170
Division A	150		60	90	----
2-digit group, A-1	150		60	90	----
3-digit group, A-11	150	----	50	90	----
Division B	180	60	50	----	70
2-digit group, B-1	180	60	50		70
3-digit group, B-11	130	10	50	----	70
3-digit group, B-12	50	50	----	----	----
Division C	200	20	20	60	100
2-digit group, C-1	100	20	20	60	----
3-digit group, C-11	100	20	20	60	----
2-digit group, C-2	100				100
3-digit group, C-21	100		----	----	100

In this tabulation, the worker had greater earnings at the three-digit level in industry A-11 than in any other three-digit industry; at the two-digit industry he had greater earnings in industry B-1 than in either A-1, C-1, or C-2; and at the divisional level he earned more in division C than in either A or B. Therefore, applying the plurality earnings test, this worker is assigned to industry A-11 at the three-digit level, B-1 at the two-digit level, and to C at the division level.[9]

Quarters of Work [10]

In this series, because workers are classified both by quarters worked [10] in their major industry and in all wage and salary employment, quarters of work of the hypothetical worker whose employment and earnings were illustrated previously are as follows:

	Major industry	*All wage and salary employment*
Private nonagricultural	4	4
Division C	4	4
2-digit group, B-1	3	4
3-digit group, A-11	2	4

Employer. An employer in this study is an individual, partnership, or corporation recognized under the law as a separate entity meeting certain criteria.[11] However, a firm which separately incorporates at each of its locations may be considered a separate employer at each location. Thus, a worker transferred from one to another location that is incorporated separately may have more than one employer in the same year even though he continued to work for the same firm.

Industrial classification. Employment and earnings data based on the Social Security Administration's (SSA) data file are classified according to the Administration's industrial classification system. This system differs slightly from that published in the *Standard Industrial Classification Manual* (SIC), and used in most statistical series in the assignment of industry codes to governmental units. Most statistical series classify governmental units into SIC Division I–Government. The SSA, however, classifies only policymaking governmental units in Division I. All separable nonpolicymaking units are assigned to nongovernmental SSA industry classification code appropriate to their activity. Thus, for example, all employment with policymaking boards of education (classified by the SSA and SIC as government) has been excluded from this study. Schools, colleges, and other operating units covered under voluntary election provisions of the act, however, were treated as service industry employment, because the units were classified by SSA into SIC 82, educational services.[12]

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[9] An unpublished tabulation, prepared by the Social Security Administration, indicated the industry of major earnings at the three-digit level for about 12 percent of all covered workers was part of a two-digit industry different from the workers two-digit industry of major earnings.

[10] "Quarters of work" and "quarters of coverage" are not synonymous. A quarter of coverage based on covered nonagricultural employment is a calendar quarter in which the individual was paid $50 or more; a quarter of coverage also may be credited on other bases such as agricultural employment or self-employment.

[11] For details, see the *Social Security Handbook*, op. cit. In addition, because some workers work for more than one employer during the same week, data showing number of employers should be used with caution.

Employment and earnings data based on the Railroad Retirement Board's file are classified into the following industries as defined in the *SIC Manual:* Railroads, SIC 401; sleeping car companies, SIC 402; express companies, SIC 404; rental of rail cars companies, SIC 474; and other companies performing services railroad transportation and certain railway labor organizations, SIC 861 and 863. In each case the assignment is based on the industrial classification of the worker's last employer who was covered under the Railroad Retirement Act. Data for workers who had earnings in more than one industry, all of which were covered under the social security system or one of which was covered under the railroad retirement system, are classified and presented separately and in combination.

Single and multi-industry workers–at each level of industry classification the employment experience of each sample member was examined to see if all of his earnings were in one or more than one industry. Those with earnings in more than one industry were classified as multi-industry workers. This conceptual approach may be seen in the case of a worker who was employed, as illustrated below, by an employer in each of two three-digit industries within the same two-digit industry.

Industry level	*Number of employers*
Division A	2
2-digit group, A-1	2
3-digit group, A-11	1
3-digit group, A-12	1

Region of major earnings. The region in which workers had their major earnings is determined by a plurality earnings test similar to that described in detail in "Major earners and industry of major earnings." The region in which he had greater earnings than any other is his region of major earnings.

In a few cases, earnings in the industry and region of major earnings may not coincide. All data for major earnings are classified first by industry and then by region. A worker who earned 40 percent of his annual wages in industry A in the Northeast, 30 percent in industry B in the South, and the remaining 30 percent in industry C also in the South would be classified as a major earner in industry A and as having had his major earnings in the South.

In this series, workers employed under the Social Security Act or the Railroad Retirement Act are divided into five regions: Four cover the 50 States and the District of Columbia; the fifth includes all employment in U.S. territories, on foreign soil, or aboard ocean-going vessels.[13]

Data in this series do not indicate where wages and salaries covered by the Railroad Retirement Act were earned.[14] Therefore, a convention was adopted ascribing all such employment to the North Central region where many railroads and railroad-related organizations have their headquarters.

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[12] For detailed information, see U.S. Department of Health, Education, and Welfare, Social Security Administration, *Comparison of Social Security Administration and Standard Industrial Classification Systems, 1963* (undated) and the guide prepared by the Administration in 1968, entitled "Industrial Codes in the Social Security Administration Continuous Work History Sample (CWHS), Data for 1957 through 1966."

[13] For all industries, except water transportation, employment outside the 50 states or the District of Columbia is only a small fraction, if any, of the total number of the industry's major earners.

[14] Employment under the Railroad Retirement Act makes up nearly all the major earners in the railroad industry (SIC 40) and a substantial proportion of those at the all transportation level, but only a very small fraction of the total employment in other industries or at the total private nonagricultural level. Thus, the convention adopted has a serious effect on the regional employment distributions and regional earnings picture at the all transportation level but little effect on other industries or at the total private nonagricultural level.

Race. All workers in this series have been divided into two groups, "white" and "Negro." The white category includes all workers except Negroes. This convention, which is different from that used in most statistical series, was adopted to minimize the effect on those groups for whom the sample was not sufficiently large to present data separately and to maximize the analytical usefulness of the data.

Uses and Limitations

The data provide an insight into the answer to the question: "How well do private nonagricultural workers do in their industry of major earnings and to what extent do they supplement these earnings by employment in other private sector industries." Data are used in collective bargaining; in formulating public policy and in making inter-industry and international comparisons; in analyzing the distribution and diversity of earnings, and variations in employment patterns among industries, regions, and between workers of different races and sexes.

The data, however, have several substantial limitations. Some workers whose annual earnings are included in the series also have earnings in self-employment, agriculture, or employment in governmental units excluded from the series. As a result, these workers appear to have low annual earnings. Probably most of these workers were attached to the employed work force only a very limited extent. The unavailability of data on hours or weeks worked or paid for, or occupational group (other than in railroading) seriously limits the analytic potential of the series. The 3–5 years lag between the reference period and the date of publication introduces another limiting factor. These delays result primarily from reporting requirements established by the law, the administrative requirements of the collecting agencies, and the processing required to reduce the mass of micro data into statistical summaries. Nevertheless, since employment patterns usually change very slowly and relative earnings distributions generally are quite comparable from year to year even though the level of earnings moves upward, the relationships shown are indicators of the current situation.

Nothwithstanding the limitations, data from this series, unlike those from other sources,[15] permit an analysis of the distribution of wage and salary earnings and employment patterns of workers by demographic characteristics, industry, and quarters of employment. Thus, they are uniquely useful to all concerned with the annual wage and salary income of individuals and the employment patterns of those in the private nonagricultural work force.

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[15] Dissimilarities in concept or method between the BLS annual earnings and employment pattern series and other series may result in important differences in sampling and nonsampling variability between series. Therefore, caution must be exercised in using data from the BLS annual earnings series in conjunction with data from other statistical series. The major sources of other annual earnings data together with a brief explanation of the most important difference between them and the data in this series are noted below.

The Social Security Administration (SSA) publishes some annual earnings data by industry. Their most recent report *Workers Under Social Security, 1960* (1968), provides statistical information about employment, earnings, and insurance status of workers under old-age, survivors, disability, and health insurance. The SSA also publishes selected summary data in the *Social Security Bulletin*. The industry attachment concept used by the SSA, however, is different from that used in this study. Further, the Social Security data do not include earnings in employment covered by the Railroad Retirement Act.

The Railroad Retirement Board (RRB) annually publishes a "research and statistics note" which provides information about the total railroad earnings of railroad employees. The RRB data, however, exclude earnings in employment not covered by the Railroad Retirement Act.

Some annual earnings data at the all-industry level by occupational group are published by the Bureau of the Census, U.S. Department of Commerce, in "Consumer Income," Series P-60 of the *Current Population Reports*. This publication also provides a distribution of wage and salary earnings, at the all-industry level, by sex and race. In addition average earnings by sex are presented for selected industry divisions and for a few major industry (two-digit SIC) groups. The study, based on a household survey, does not provide distributions of wage and salary earnings by industry group and has different concepts of industry attachment from those used in this study.

The Office of Business Economics of the U.S. Department of Commerce also publishes estimates of the average annual earnings of "full-time employees" in its *Survey of Current Business;* these estimates do not reflect the effect on average earnings of workers who work less than a full year.

—ARNOLD STRASSER

Chapter 23. Measuring Collective Bargaining Settlements

Background

The Bureau's program of measuring the effects of collective bargaining settlements on hourly labor compensation is a reflection of two developments: One, the growing importance of fringe benefits as a proportion of employee compensation, and two, increased concern about the effects of collectively bargained wage and benefit changes on the price level.

Whereas in earlier years the economic terms of negotiated settlements could be equated largely with agreed-upon changes in wage rates, today, possible changes in a host of pay supplements must be considered—such as various forms of premium pay, paid leave, cash bonuses, and employer contributions to funds providing pension or health and welfare benefits. Although straight-time pay for working hours is still the major element of compensation, supplements are now a significant portion, accounting for about a fifth of total employer outlays for worker compensation.[1]

Moreover, growing concern during the 1960's over the extent to which increased labor costs may contribute to inflation has heightened interest in the size of collective bargaining settlements.

Responding to these influences, the BLS began estimating the cost of wage and benefit (i.e., "package") changes in a limited number of key settlements in 1964. The work was expanded the following year and, since 1966, the Bureau has attempted to determine the price of all settlements affecting 5,000 workers or more in the private nonfarm sector. In addition, a separate series has been developed for the construction industry, covering settlements for 1,000 workers or more.

Description of Series

At present, the Bureau publishes two sets of data on wage-benefit decisions. One shows the annual rates of increases in settlements reached in a given time period and scheduled to go into effect at any time during the term of the agreements. The other is limited to the changes set for the first 12 months of the agreements.[2] Published data summarize settlements reached during individual quarters of a year, during full years, and during the first 6 and 9 months of each year.

Frequency distributions are shown for workers grouped by the size of their settlements. In these distributions, all workers affected by a given action are entered at the average for the bargaining unit. The sums of the individual settlements are averaged—both means and medians are presented—each settlement being weighted by the number of workers affected. However, the pricing of individual settlements is not disclosed.

Averages for full years are available separately for manufacturing and nonmanufacturing industries. Otherwise, no industry detail is published, except for the separate construction industry series.

As indicated in the preceding paragraphs, these series relate to the pricing of *decisions*, i.e., they measure the effect of changes agreed on in a given period although, considering the general practices of negotiating multiyear collective bargaining agreements containing provisions for annual (and sometimes more frequent) improvements, the changes may be introduced only at a subsequent date. Work has recently been completed on the development of data on the wage and benefit changes actually placed in effect in specified periods, whether as a result of current bargains, changes agreed upon earlier but with deferred effective dates, or the operation of cost-of-living wage escalator clauses.

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[1] See Alvin Bauman, "Measuring Employee Compensation in U.S. Industry," *Monthly Labor Review*, October 1970, p. 23. It is difficult both to measure the growth of supplements over the years and to quantify their current importance. The national income accounts provide one pertinent source of data. They show that supplements to wages and salaries rose as a percentage of total employee compensation from 1 percent in 1929 to 10 percent in 1970. *The National Income and Product Accounts of the United States, 1929–1965: Statistical Tables*, U.S. Department of Commerce, Office of Business Economics (1966), p. 14; *Survey of Current Business*, January 1971, p. 10. These figures, however, do not reveal the relative importance of all supplements in either year, since many—such as premium payments, leave payments, and cash bonuses—appear as parts of wages and salaries. The figures therefore are not comparable to those found in surveys of employer expenditures for supplementary compensation.

[2] Publication of first-year changes is a recent innovation. Before 1970, the Bureau published two measures of change over the life of the contract, the so-called equal timing and the time-weighted measures. The former assumed equal spacing of changes during the term of the contract; the latter took account of the actual effective dates of wage and benefit changes. The time-weighted measure has been discontinued, because it appeared to be of significance primarily for the analysis of individual settlements rather than for overall series of the type produced by the Bureau. Moreover, dropping of the time-weighted measure and introduction of a series on first-year changes provides parallel statistics both on wage-rate changes alone and on wages and benefits combined.

Data Sources and Collection Methods

The terms of the settlements to be priced are obtained primarily from secondary sources, such as general circulation newspapers and periodicals and union, management, and trade publications. Collective bargaining agreements and documents on pension and health and welfare plans also are consulted. When these sources are inadequate, direct requests for information are made to the companies and unions involved.

Large quantities of statistical data, as well as the settlement terms, are required. These are needed both to determine existing employer outlays and to assay the effect on these expenditures of agreed wage and benefit changes. Efforts are made to use existing data. However, when these prove inadequate, the parties are requested to furnish data. Such requests, it must be emphasized, are made to receive specific information from which the Bureau can price settlements; the requests are not made to receive the parties' own evaluations of the terms of their settlements.

One of the major sources of information on current hourly earnings is the establishment information which BLS obtains through its monthly employment, payroll, and hours survey. Information on current outlays for pay supplements may be available from BLS surveys of expenditures for such benefits. Pertinent information for estimating expenditures for some items may be found in industry wage surveys, e.g., extent of late-shift work and occupational employment distributions. Annual financial reports filed with the Department of Labor under the Welfare and Pension Plan Disclosure Act provide useful material. Not all the sources tapped are governmental; for instance, information on workmen's compensation insurance rates is reported by the National Council on Compensation Insurance.

Sampling and Estimating Procedures

As was noted earlier, the Bureau attempts to cover all settlements for 5,000 workers or more (1,000 or more in construction) in the private nonfarm sector. Substantially all such settlements come to the attention of the Bureau and are included in its series, it is believed.

Discussion of procedures for pricing individual settlements [3] may be centered around three questions: (1) What items in a collective bargaining settlement are to be priced? (2) How are the costs of these items to be determined? (3) How are these costs to be expressed?

Coverage. Little evidence is needed to demonstrate that many terms of a union-management agreement, not merely the wage and benefit provisions, may affect directly or indirectly an employer's costs. For example, one of the so-called "noneconomic" terms of an agreement—seniority—may have a limited influence on costs through its effect on employee efficiency.[4] However, such an item is essentially not measurable.

Consequently, the BLS program is confined to the wage-benefit component of collective bargaining agreements, i.e., to the effect of settlements on employer outlays for employee compensation. This component, clearly, is of major significance in its own right. Included are items such as changes in wage rates; modifications in premium pay, bonuses, paid leave, and severance pay; and adjustments in employer payments for pension, for health and welfare, and for supplemental unemployment benefits, excluding the costs of administering these benefits. Also included are changes in formal contract provisions specifying paid time for clothes change, washup, and lunch periods.

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[3] Production of statistical series merely entails grouping and averaging the pricing of individual settlements. Published distributions show the number of workers under known settlements for which data were insufficient to permit pricing.

[4] Almost inevitably a tendency has developed to regard all contract changes as serving to increase employer payments. Although this undoubtedly is the common result, some changes, even when proposed by unions, may lower costs. Union-management cooperation schemes have at times provided examples.

Excluded are informal modifications of unwritten rest-period practices; items related to, but not normally considered part of, compensation—such as per diem payments, moving expense reimbursements, and payments for safety clothing; and provision of facilities or services such as parking lots and health units, the costs of which often are charged to capital rather than labor accounts.

Determination of costs. Since a value is placed on settlements at the time they are reached, the costs attributed to them obviously are estimates of outlays to be made in the future; they cannot be taken from employers' accounting records. The estimates are made on the assumption that conditions existing at the time the contract is negotiated will not change. For example, estimators assume that methods of financing pensions will not change, and that expenditures for insurance will not change except as a result of altered benefit provisions or modified participation because of changes in company contributions. They also assume that the composition of the labor force will not change.

In this regard, except for any guaranteed increases, which are treated as deferred adjustments, possible wage-rate changes as a result of cost-of-living escalator clauses are excluded because of difficulties in predicting movements of the Consumer Price Index for 3 years—the time span of many collective bargaining agreements. Thus, the Bureau prices the wage and benefit changes that would go into effect if the price level were to remain stable.[5]

Nevertheless, package estimates do attempt to measure the costs associated with actual characteristics of the work force affected by the settlements, not the costs for some hypothetical employee group. Attempts to base estimates on the actual age, length of service, sex, and skill characteristics of the workers involved recognize that the choice in incorporating alternative benefit changes into contracts is affected by their costs, which, in turn, are affected by the character of the work force. For example, an extra week of vacation after 15 years of service will cost very little when only 10 percent of the workers have that much service, but will cost about 1 percent of straight-time hourly earnings when half of the workers have been employed for 15 years or more.

As a rule, indirect effects of settlements are ignored: factors such as possible extension of settlement terms to nonunion workers in the same firm or to members of other bargaining units. Similarly, the cost of providing lengthened vacations is measured by the wages and salaries paid for the additional time off; costs of hiring vacation replacements, if necessary, are not considered. Moreover, effects on unit labor costs, which involve consideration of employee efficiency as well as employer payments, are disregarded.

However, "creep"[6] is accounted for. Creep reflects the fact that an increase in wage rates will have a secondary effect on employer costs through its effect on outlays for benefits. A 20-cent-an-hour wage increase will affect not only straight-time wage rates but also supplementary payments governed by wage rates—such as overtime premiums, leave payments, pension benefits related to salary level, and social security payroll taxes (if earnings are not at or above the statutory maximum tax base). Creep is taken into account by raising each wage increase provided by the new contract by a creep, or loading, factor. This factor is essentially the ratio of current hourly expenditures on benefits that vary with wage levels to current straight-time hourly earnings.[7]

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[5] The series on wage and benefit changes actually placed into effect includes escalator adjustments, since the issue of prediction of CPI movements does not arise.

[6] The terms "roll-up" and "bulge," among others, also are used to express the same idea.

[7] It varies from this ratio to the extent that there are limits on earnings that are subject to social security taxes.

Many items in a collective bargaining agreement are priced without difficulty. This is particularly true when settlement terms are expressed as cents-per-hour adjustments, e.g., a 20-cent-an-hour general wage increase[8] or a 5-cent increase in employer contributions to a health and welfare fund. These stipulated cents-per-hour figures are utilized as the costs of the settlement provisions.[9] Percentage wage adjustments are converted to cents-per-hour figures on the basis of current average straight-time hourly earnings. Although less direct, the cost of an additional holiday is estimated adequately by prorating 8 hours' average pay (if the normal workday is 8 hours) over the number of annual working hours per employee. The cost of an additional week of vacation for 25-year employees is estimated similarly, but one must know the number of employees with the required seniority.

Other settlement terms are more difficult to price. For example, the cost of an unfunded severance pay plan depends on the frequency of layoffs as well as on plan provisions. Estimates of such frequencies are at best hazardous. Pension improvement costs are particularly difficult to estimate because of the considerable discretion employers often have in funding their obligations.[10] The general approach followed by the Bureau is to assume that a given pension benefit increase will raise existing expenditures for current service proportionately. Since employer contributions for pensions frequently vary widely from year to year, outlays in several past years are examined to develop a measure of current payments.

Under the BLS framework, estimates concerning most provisions are of actual cash outlays to be made by employers. However, in the case of improved paid leave provisions, a change may entail time off for workers, but not additional cash payments by the employer. However, payment per hour worked will rise and this change is taken as the cost effect of the settlement provision.

In case of a reduction in the basic workweek, the increase in hourly rates needed to maintain weekly pay is the major item BLS prices. To some extent, a reduced basic workweek may be accompanied by additional overtime work. However, unless this overtime is provided specifically in the agreement, it is ignored in the cost estimate.

Increases in hourly pay rates are not the only cost effects considered in this instance. Even if there is no change in total employer outlays for particular pay supplements but the contract provides for reduced hours, the outlays for them per hour worked will rise and affect the cost of settlement.

Expressing the costs. The total cost of a given settlement is obtained by adding up the cents-per-hour-worked costs of each of the individual wage or benefit changes. This sum is then expressed as a percent of pay, as this ratio facilitates inter-company comparisons by eliminating influences of payroll size and wage level. Furthermore, since economic studies generally emphasize relative rates of change in statistical series, percent-of-pay costs can be integrated into broad economic analyses.

Expression of package costs as a percent of pay requires estimation of an appropriate base (the denominator of the ratio) as well as the cost of the settlement terms (the numerator). The base used by the Bureau consists of current outlays per hour worked for all items of employee compensation, as defined, plus employer expenditures for legally-required social insurance. The latter is part of employee compensation, although not subject to change through collective bargaining.

Since collective bargaining agreements generally are for 2-year periods or longer, BLS expresses the total percent increase over the contract term at an annual rate to permit comparison among agreements for differing time spans as well as to facilitate the use of the data in conjunction with other statistical series. These annual rates of increase take into account the compounding of successive changes.

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[8] Where appropriate, the effect of a general wage increase on incentive earnings is included in the measurement of the wage increase.

[9] Since estimates are on a cents-per-hour-worked, rather than per-hour-paid-for, basis, agreed-upon increases are adjusted if they are on an hours-paid-for basis.

[10] Employers' contractual obligations commonly are to provide given levels of pension benefits, rather than to expend specified amounts of money.

In addition, the Bureau computes first-year changes, i.e., the total change scheduled for the first 12 months of the agreement, expressed as a percent of current hourly compensation. As a general rule, the first-year increase is larger than the average annual increase over the full term of the agreement; contracts commonly are "front-loaded."

Contracts are considered to run from their effective dates to their termination dates. However, where wage reopening clauses are found, the reopening date is taken as the termination date and any agreement under the reopening clause is treated as a new settlement.

Pricing of a collective bargaining settlement is illustrated on the sample worksheet. This example assumes that at the time of the settlement straight-time hourly earnings averaged $3 and that total supplementary benefits were $1 an hour worked, providing total compensation of $4 an hour worked (the base). Also assumed is a creep factor of 20 percent, 2,000 annual working hours per employee, and a 3-year agreement effective January 1, 1971, providing the immediate and deferred wage and benefit improvements shown on the worksheet. The settlement provides a 7.1 percent first-year package and a 6.5 percent annual rate of increase over the 3-year term. The worksheet also shows the wage and benefit gains scheduled for each of the 3 calendar years (1971, 72, and 73), from which material the series on changes actually placed into effect is developed,[11] and the wage-rate changes apart from benefit improvements. The latter data are computed without reference to creep and relate wage gains to average hourly earnings rather than average hourly compensation.

Presentation and Analysis

Press releases covering wage changes and wage and benefit changes in major collective bargaining settlements are issued toward the end of the month following the close of each quarter. These releases contain preliminary data for the first 3, 6, and 9 months of a year and for the full year. This material also appears in *Current Wage Developments (CWD)*. Final quarterly material (both for individual quarters and the cumulative quarterly material appearing in the press releases) is included in the *CWD* article for the full year. An annual summary also appears in the *Monthly Labor Review*.

Summary data for recent individual quarters and 4-quarter periods are shown monthly in *CWD* together with other statistical series depicting aspects of change in employee compensation. The presentation facilitates analysis of the interrelations between the series and the divergences in their movements.

Uses and Limitations

Package cost data are used extensively by union and management officials, for whom data on developments in other firms and industries often provide an important criterion for their own deliberations. In a different vein, the data are examined by government officials and private analysts, concerned with the economic repercussions of collective bargaining on the costs of individual employers and on wage-price-employment relations within the economic system as a whole.

The user of the data should remember that the series does not purport to measure all changes in average hourly expenditures for employee compensation. Estimates are derived under the assumption that all factors affecting employer outlays other than contract modifications are constant.

Nevertheless, changes in the volume of overtime and shift work, in the composition of the work force, in the level and stability of employment, in factors affecting incentive earnings, etc., are not unusual, and will influence outlays for employee compensation. In some instances, these changes are introduced by management specifically to offset costs of new labor agreements. In other cases, changes are the result of modified production schedules or of technological developments independent of collec-

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[11] Thus, the series on effective package changes essentially is based on the pricing of items at the time settlements are reached. The only exception is the subsequent addition of cost-of-living escalator wage changes.

PACKAGE COST ANALYSIS WORKSHEET

Name - Location - Union																																			SCHED.					A.H.E.				SIC		EMPLY.						F.Y. Wages *				Total Wages *				DUR			Mo. Neg.		ESCL	BASE				W&B OTL*						W&B F.Y. *			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
X	Y	Z			C	O	M	P	A	N	Y		A	N	Y	W	H	E	R	E										U	S	A			9	8	7	6	5		3	0	0	3	7		2	5	0	0	0			7	8		1	9	0	3	6	0	0	1	2		4	0	0		6	5					7	1	

Date Priced Out ----------------	3/15/71
Previous Expiration Date -----	12/31/70
Date Negotiated: -------------	1/15/71
Effective Date of Agreement --	1/1/71
New Expiration Date ----------	12/31/73

Escal. Clause Infor. (if applicable)

N/A

STATISTICAL INFORMATION

MEASURE:	Year	Total Cents	Divided By ** --	Total Percent Increase	Annual Rate of Increase
First-Year Wages & Benefits --------	☒	28.25	$ 4.00	☒	7.1%
Wages and Benefits (Over life of contract) -----------	☒	83.61	$ 4.00	20.90	6.5%
First-Year Wages Alone -------------	☒	23.54	$ 3.00	☒	7.8%
Wages Over Life of Contract --------	☒	56.91	$ 3.00	18.97	6.0%
Wages and Benefits Effective in ----	1971	28.25	$ 4.00	☒	7.1%
Wages and Benefits Effective in ----	1972	22.69	$ 4.2825	☒	5.3%
Wages and Benefits Effective in ----	1973	32.67	$ 4.509	☒	7.2
Wages and Benefits Effective in ----	N/A	N/A	N/A	☒	N/A
Wages and Benefits Effective in ----	N/A	N/A	N/A	☒	N/A
Wages Alone Effective in -----------	1971	23.54	$ 3.00	☒	7.8%
Wages Alone Effective in -----------	1972	16.18	$ 3.235	☒	5.0%
Wages Alone Effective in -----------	1973	17.19	$ 3.397	☒	5.1%
Wages Alone Effective in -----------	N/A	N/A	N/A	☒	N/A
Wages Alone Effective in -----------	N/A	N/A	N/A	☒	N/A
Other: -----------------------------	N/A	N/A	N/A	N/A	N/A

Remarks: ** For wages and benefits, divide by the base; for wages alone, divide by the A.H.E.

Note: For the effective measures, divide by the adjusted base or A.H.E. as of the start of the appropriate year.

Priced Out By: John Doe

Increases in cents

Provision		Exclude creep	With creep
Wages: 5% @ 3.00	1/1/71	15.00	18.00
Skill adjust - 5¢ for 20%	1/1/71	1.00	1.20
Impr. shift diff.	1/1/71		
add. 2¢ hr. on 2nd shift for			
30% = .6¢			
add. 3¢ hr. on 3rd shift for			
20% = .6¢		1.20	1.44
2% @ 3.172	10/1/71	6.34	7.61
5% @ 3.235	7/1/72	16.18	19.42
3% @ 3.397	1/1/73	10.19	12.23
2% @ 3.499	7/1/73	7.00	8.40
Holidays: 1 add.	1/1/73		
$3.499 @ 8 hrs. = 27.99 ÷			
1972 = hrs. =			1.42
Vacations: Impr. averaging 20 add.			
hrs. of vac./ yr. for all empls.			
	1/1/72		
$3.235 @ 20 hrs. = 64.70 ÷ 1980 hrs=			3.27
added impact in 1973			
$3.499 @ 20 hrs. = 69.98 ÷ 1972 hrs.			
= 3.55¢ (3.55¢ - 3.27¢) =			.28
Pensions add. 5¢ / hr. to fund	1/1/73		
5¢ @ 2080 hrs. = $104.00 ÷ 1972 =			5.27
Dental: Plan estab.	1/1/73		
Estimate avg. cost of $100/empl.			
$100 ÷ 1972 =			5.07
TOTALS: Wages and fringes ---		☒	83.61
Wages ----------------		56.91	☒
		Over life of contract	

* No data should be supplied in these columns. When verification is made, the data will be supplied.

tive bargaining, and may either add to or subtract from the cost of the union-management settlement. In any event, an important influence on the level of employee compensation, social insurance taxes, is essentially outside the scope of the package cost estimates.

Two other factors must be considered. First, package costs are only estimates of future changes in employer outlays. As already emphasized, completely accurate estimates should not be expected. Secondly, the data apply primarily to settlements for 5,000 workers or more.

Although package cost estimates are extremely valuable as comprehensive measures of change resulting from union-management negotiations, to use the estimates as precise, unambiguous, and unfailing measures of the economic effects of collective bargaining is adding an assignment which the data are incapable of fulfilling.

Technical References

Number

1. David, Lily Mary and Sheifer, Victor J. "Estimating the Cost of Collective Bargaining Settlements," *Monthly Labor Review*, May 1969, pp. 16–26. Reprint No. 2617.

   A more detailed description of the Bureau of Labor Statistics procedures for pricing collective bargaining settlements.

2. Sheifer, Victor J. "The Relationship Between Changes in Wage Rates and in Hourly Earnings," *Monthly Labor Review*, August 1970, pp. 10–17. Reprint No. 2688.

   Compares general wage rate and hourly earnings changes in 87 manufacturing establishments over a 7-month period. The issues raised are pertinent in any consideration of the relation between package cost estimates and actual changes in hourly compensation expenditures.

—VICTOR J. SHEIFER

Chapter 24. Wage Chronologies and Salary Trend Reports

Background

Most Bureau of Labor Statistics series showing the movement of money wages—such as data on average hourly earnings—apply to large aggregates of workers, e.g., all production workers in a given manufacturing industry either nationwide or in a particular State or local area. Wage chronologies and salary trend reports, on the other hand, apply to more narrowly defined employee groups.

Chronologies report on wage-rate changes made by specific employers. Except for the study on Federal Classification Act employees, they deal with developments under collective bargaining agreements. In all cases they report on supplementary benefit as well as wage changes.

Salary trend reports present and analyze changes in salaries of selected categories of government employees.[1] In most instances, however, they do not contain separate data for individual employers.

Both programs date back to the early post-World War II period. The wage chronology program was instituted in 1948 and the first salary trend report was issued in 1950. To the extent possible, material for earlier years was included in the initial reports.

Description of Program

Chronologies. The following 32 chronologies currently are being maintained:[2]

1. Aluminum Company of America
2. American Viscose Division of FMC Corp.
3. The Anaconda Company
4. Armour and Company
5. A.T. & T.—Long Lines Department
6. Berkshire Hathaway Inc.
7. Bethlehem Atlantic Shipyards
8. Bituminous Coal Mines
9. The Boeing Company
10. Commonwealth Edison Company
11. Dan River Mills
12. Federal Classification Act Employees
13. Firestone Tire and Rubber Company and B.F. Goodrich Company
14. Ford Motor Company
15. International Harvester Company
16. International Paper Company (Southern Kraft Division)
17. International Shoe Company
18. Lockheed-California Company (A division of Lockheed Aircraft Corp.)
19. Martin-Marietta Corp.
20. Massachusetts Shoe Manufacturing
21. New York City Laundries
22. North America Rockwell Corp.
23. North Atlantic Longshoring
24. Pacific Coast Shipbuilding
25. Pacific Gas and Electric Company
26. Pacific Longshore Industry
27. Railroads—Nonoperating Employees
28. Sinclair Oil Companies
29. Swift & Company
30. United States Steel Corp.
31. Western Greyhound Lines
32. Western Union Telegraph Company

Each chronology covers either a single wage-determination unit or a group of closely related units. It may cover an individual company and union (e.g., Ford Motor Company and the United Automobile Workers), a single company and two or more unions (e.g., the Aluminum Company of America and the United Steelworkers and the Aluminum Workers), a group of employers and a single union (e.g., New York City Laundries and the Amalgamated Clothing Workers), a group of companies and a group of unions (e.g., Pacific Coast shipbuilding companies and a number of craft unions), or a governmental body (e.g., the chronology covering Federal Classification Act employees).

The program is designed to summarize long-term wage-benefit developments in a variety of industrial environments. Accordingly, chronologies cover groups that (1) have existed over a period of years; (2) are important in their own industry; (3) employ a significant number of workers; (4) are of general public interest; and (5) are willing to cooperate with the Bureau and for which appropriate information is available.

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[1] Although other BLS studies report on salary trends, they do not have this specific title. The time series in these studies are often by-products of repetitive Bureau survey activity.

[2] Several chronologies have been discontinued, generally either because of fragmentation of bargaining units, declining importance, or because standardization of collective bargaining eliminated the value of more than one chronology in a given industry.

Each chronology is divided into a narrative synopsis of the collective bargaining or legislative developments resulting in wage and benefit changes and a tabular summary of the changes themselves. Each chronology contains separate tables showing general wage changes and changes in supplementary benefits.

As used in the wage chronology program, general wage changes are defined as upward or downward changes that affect an entire unit or a substantial group of workers at one time. Excluded are adjustments in individual rates (such as promotions, or merit or seniority increases) and minor adjustments in wage structure (such as changes in individual job rates or incentive rates) that do not have an immediate and noticeable effect on the general wage level. Because of the omission of nongeneral wage changes, fluctuation in incentive earnings, and other factors, the sum of the wage changes listed in each chronology will not coincide necessarily with the movement of average hourly earnings over the same period.

The tables generally include benefits such as guaranteed minimum earnings, shift premiums, daily and weekly overtime, weekend premiums, pay for holiday work, paid vacations and holidays, other paid leave provisions, reporting time, waiting time, paid lunch periods, pay for travel time, and health, welfare, and pension benefits.

When minimum plant rates, common labor rates, occupational wage rates, or rates for labor grades are important in the wage structure, they are shown in chronological sequence, parallel to the general wage changes.

Salary trend reports. These reports currently are issued for Federal classified employees, firefighters and police patrolmen, and urban public school teachers. They all contain indexes of long-term salary movements. Data on recent and current salary levels also are provided.

Reports for firefighters, police patrolmen, and teachers basically apply to cities of 100,000 population or more, and provide separate figures for regions and city-size groups, as well as overall national data. Material on individual cities, however, is not shown. Because it deals with a single employee group, the report on Federal classified employees contains considerable detail on developments in wage structure.

Data Sources

Both wage chronologies and salary trend reports are developed primarily from published data. Collective bargaining agreements, pension and welfare documents, and newspaper and periodical articles provide the main sources of chronology information. These are supplemented by direct requests to the parties for information when available written records are inadequate. Thus, most of the information used to compile chronologies is, in one form or another, already a matter of public knowledge. In all instances, to avoid dissemination of erroneous material, pre-publication drafts of reports are submitted to the parties for their review and comments.

Salary trend reports are prepared largely from salary data collected by other groups. That for Federal classified employees is based on data published by the U.S. Civil Service Commission in its annual report on *Pay Structure of the Federal Civil Service.*

Reports on teachers and firefighters and police patrolmen are based mainly upon compilations of data for individual cities made by the National Education Association and the International City Management Association, respectively. These are supplemented by annual surveys of salaries and working conditions conducted by the International Association of Fire Fighters and the Fraternal Order of Police and, when necessary, by direct inquiries by the Bureau of Labor Statistics.

Statistical Procedures

Statistical analysis in these programs is confined largely to the preparation of indexes of salary movements of groups of government employees. Sampling problems do not arise since in each case an effort is made to examine the total universe, i.e., all Federal classified employees, and all teachers, firefighters, and police patrolmen in cities of 100,000 population or more.

Indexes generally are computed by a method that minimizes the effect of year-to-year changes in relative employments in the cities or occupational categories covered. As a rule, chain indexes are employed, i.e., the index for the current year is obtained by adjusting the index for the prior year by the percentage change in average salaries over the intervening period. Normally, to preserve a pure measure of salary change, average salaries for each of the two years are computed using current-year employments as weights.

Presentation and Analysis

Wage chronologies. Wage chronologies are published individually as BLS Bulletins and revised periodically to incorporate material resulting from new collective bargaining settlements or legislative developments. Bulletins are updated after every other contract settlement or legislative enactment. Intervening developments are reported in supplements to existing bulletins. Thus, when 3-year collective bargaining agreements are negotiated, a revised bulletin should be issued once in 6 years.

Salary trend reports. Articles covering developments for Federal classified employees and firefighters and police patrolmen appear annually in *Current Wage Developments.* Press releases containing summary data for firefighters and police patrolmen precede publication of the articles. Salary changes for teachers are reported on in biennial *CWD* articles, since the basic data are issued at two-year intervals. Reprints are available of all *CWD* articles. In addition, all articles issued up to the mid-1960's have been collected and reprinted in the BLS Bulletins listed in the technical references at the end of this chapter.

Chronologies are primarily listings of wage and benefit changes, with background material limited to descriptions of the collective bargaining or legislative processes leading up to the changes. Greater effort is made in salary trend reports to analyze the data. Background factors are presented and the wage movements are compared with wage changes for other employee groups.

Uses and Limitations

Both wage chronologies and salary trend reports serve two audiences; they are useful as sources of comparative wage data for union, management, and government officials engaged in wage setting and as research tools for economic analysts. Chronologies are particularly useful for negotiators because the studies present detailed information on developments in units that not infrequently provide wage leadership for their industries. Moreover, comparisons of wage and benefit changes in such units provide valuable insights into wage setting in the American economy. In addition, the data help to explain the movements in aggregative statistics such as the Bureau series on average hourly earnings.[3] Salary trend reports are noteworthy as one of the relatively few sources of data on wage movements and levels in the government sector.

Although wage chronologies describe changes in supplementary benefits, they do not measure the effect of these changes on employers' hourly labor costs. In this connection, decisions on whether or not to adopt a given benefit change may hinge on its cost, which may vary among bargaining units with work forces of differing composition.

The temptation may be to use salary trend reports as indicators of salary movements for government employees in general. However, the particular groups covered by these reports are by no means a representative sample for this purpose.

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[3] For examples of the use of chronologies by economists, see Harold M. Levinson, *Postwar Movement of Prices and Wages in Manufacturing Industries,* Study Paper No. 21, Study of Employment, Growth, and Price Levels, Joint Economic Committee, 86th Cong., 2d Sess. (Washington: 1960); and John E. Maher, "An Index of Wage Rates for Selected Industries, 1946–1957," *Review of Economics and Statistics,* August 1961, pp. 277–282.

Technical References

Number
1. Arnow, Philip, Bloch, Joseph W., and Quant, Willis C. "The New Wage Chronology Series," *Monthly Labor Review*, December 1948, pp. 581-583.
Describes the aims of the chronology series at the time it was introduced.
2. U.S. Department of Labor, Bureau of Labor Statistics. *A Directory of Wage Chronologies, 1948-June 1969* (1969).
Lists chronologies that were maintained in 1969, the time span covered, and the place of publication.
3. ———. *Salary Trends: City Public School Teachers, 1925-65* (Bulletin 1504, 1966).
4. ———. *Salary Trends: Federal Classified Employees, 1939-64* (Bulletin 1444, 1965).
5. ———. *Salary Trends: Firemen and Policemen, 1924-64* (Bulletin 1445, 1965).
Compilations of previously published salary trend articles.

—VICTOR J. SHEIFER

Productivity and Technology

Chapter 25. Output Per Man-Hour: Private Sector

Background and Description of Measures

To provide information about the relationship between productivity, prices, wages, employment, and economic growth, the Bureau of Labor Statistics publishes indexes of output per man-hour, compensation per man-hour, unit labor costs, and related costs for broad economic sectors. Measures of output per man-hour have been developed for the total private sector and the farm and nonfarm sectors annually from 1909 to the present. Since 1947, these data have been supplemented with comparable measures on hourly compensation and related costs for these sectors as well as manufacturing. Post World War II indexes are available quarterly as well as annually. In addition, to the farm, nonfarm, and manufacturing measures, annual information on productivity and costs is available for the nonmanufacturing sector and its component major industrial sectors. Productivity measures, first published in 1959,[1] represent the culmination of a long series of developments in productivity measurement in the Bureau.[2]

The Bureau of Labor Statistics' output per man-hour measures specifically refer to the ratio between dollar gross product (GNP) originating[3] in the private or individual sectors and the corresponding hours of all persons employed. Indexes of output per man-hour indicate the relationship between output and labor input (man-hours). Index changes through time show the effectiveness of man-hours in producing current levels of output.

Man-hours are based mainly on BLS establishment payroll data on employment and hours. These man-hours refer to hours of work and paid time for vacation holidays and sick leave.

The Bureau also develops an output per man-hour series based on labor force man-hour data from the Current Population Survey (CPS). The concept underlying the labor force man-hours is hours worked, rather than hours paid. Theoretically, the difference between the labor force man-hours series and the establishment payroll data series is equal to paid vacation time, sick leave, and other paid leave. However, actual differences in man-hours between the two series also reflect statistical variation and differences in method.

Indexes of compensation per man-hour measure the hourly costs of wages and salaries, in addition to supplemental payments, such as the contributions of employers to social security, unemployment insurance tax, and payment for private health and pension plans. Measures of real compensation per man-hour reflect the adjustment of hourly compensation for changes in the Consumer Price Index.

Unit labor costs measure the cost of labor input required to produce one unit of output and is derived by dividing compensation per man-hour by output per man-hour. Unit nonlabor payments (costs) measure the cost of nonlabor inputs such as depreciation, rents, interest, indirect taxes, in addition to profit income such as corporate profits and income of proprietorships and partnerships.

Data Sources and Estimating Procedures

Output. The real gross national product originating in the private or individual sectors is used to prepare output per man-hour estimates. Gross national product is the market value of final goods and services produced within a certain time period. It includes purchases of goods and services by consumers gross private domestic investment, net foreign investment, and purchases by Government. GNP is equal to income received by labor and property for services rendered in the current production of goods and services, in addition to capital consumption allowances, indirect business taxes, and several other minor items.

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[1] *Trends in Output per Man-Hour in the Private Economy, 1909–58* (BLS Bulletin 1249, 1959).

[2] For a detailed description of the historical development of the productivity measurement program of the BLS, see Chapter 26.

[3] Gross Domestic Product equals Gross National product less the net return on foreign investments.

Gross national product in current dollars cannot be used directly as the output measure since it reflects price changes in addition to changes in physical volume. The Office of Business Economics (OBE), U.S. Department of Commerce, prepares estimates of constant-dollar GNP for the total private sector and major sectors. These estimates indicate only changes in the volume of production and are used to develop output per man-hour measures.[4]

Compensation. The OBE develops compensation of employees data as part of the national income accounts. These data include direct payments to labor, such as wages and salaries inclusive of executive compensation, commissions, tips, and bonuses and payments in kind which represent income to the recipients and supplements to these direct payments. The last item consists of employer contributions for social insurance, private pension and health and welfare plans, compensation for injuries, doctors' fees, pay for military leave, etc.

Since these compensation measures refer only to wage and salary workers, they do not reflect the cost of labor expended by proprietors and unpaid family workers. Labor costs can be seriously underestimated in sectors like the farm where proprietor man-hours represent a substantial portion of the labor input. The Bureau, therefore, imputes a payment for labor services of proprietors and family workers. Compensation per man-hour of proprietors is assumed to be the same as that of the average employee in that sector.

Unit labor and nonlabor costs. The Bureau also presents data on labor and nonlabor costs per unit of output for the private sector and its major components. Unit labor costs relate hourly compensation of all persons to output per man-hour. Unit nonlabor costs are computed by subtracting compensation of all persons from current dollar GNP and dividing by output.

Labor input (man-hours). The primary source of man-hours and employment data is the BLS Current Employment Statistics (CES) program, which provides data on employment (all employees and production or nonsupervisory workers) and average weekly hours of production workers in nonagricultural establishments. Jobs rather than persons are counted, so that multiple jobholders are counted more than once. Weekly hours are hours paid rather than plant hours. These statistics are based on payroll records from a sample of establishments where probability of sample selection is proportionate to the establishment size; large establishments (relative to the sector) fall into the sample with certainty. Data on employment, hours, and earnings are collected monthly; however, the reference period for these data is the payroll period including the 12th of the month. Methods are described in Chapter 2. Establishment data are published monthly in *Employment and Earnings* and in an annual summary.

Since the CES includes only nonfarm wage and salary workers, data from other sources (National income accounts or the CPS) are used for the uncovered sectors (farm, proprietors, unpaid family workers, and private household workers) to develop employment and man-hour estimates for the total private sector.

Separate estimates for employment and man-hours paid are developed for each major industrial sector and these are aggregated to total private and private nonfarm levels. Each man-hour is treated as a homogeneous unit; no distinction is made between workers who have different skill levels or rates of pay.

In the manufacturing sector, separate estimates for production and nonproduction worker man-hours are derived and then aggregated to the manufacturing total. Production worker and nonproduction worker employment and production worker average weekly hours are taken directly from CES data. Average weekly hours for nonproduction workers are developed from BLS studies of wages and supplements in the manufacturing sector which provide data on the regularly scheduled workweek of white-collar employees.[5]

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[4] A detailed description of the methods and procedures of estimating GNP and GDP in current and constant dollars is given in the 1954 *National Income Supplement* to the *Survey to Current Business*, U.S. Department of Commerce. Further information on Gross Product Originating estimates for major industry sectors is presented in the October 1962 issue of *Survey of Current Business*.

For nonmanufacturing sectors, employment and weekly hours paid are taken from the payroll series. Although payroll average weekly hours data refer to nonsupervisory workers for man-hours computation, the assumption is that the length of the workweek in each nonmanufacturing industry is the same for all wage and salary workers.

When establishment employment data are not available (proprietors, unpaid family workers, and private household workers), either labor force data (CPS) or national income employment data are used. On the other hand, average weekly hours are based on labor force data for hours worked rather than hours paid. However, persons who have a job but are not at work are assumed to have been paid for an average workweek in the sector where the job was located.

Analysis and Presentation

Indexes of output per man-hour show changes in the ratio of output to labor input (man-hours). These indexes relate output to man-hours but should not be interpreted as representing labor's sole contribution to production. Rather, they reflect the interaction of many forces in addition to labor and skill, such as changes in technology and increased capital investment per worker.

For economic aggregates like productivity in the private sector, changes over time reflect movements within the various component industries as well as shifts in the relative importance of each of the industries. For example, increases in output per man-hour are influenced not only by the increments or decrements in the component sectors but also by the shift from low to high productivity industries. Within industries, other forms of shifts also take place and are not accounted for adequately. In output measures, for example, changes in income and taste may be reflected in shifting consumption patterns to higher quality goods or to services rather than goods.

Short-term movements in productivity and unit labor costs often result from cyclical variation which tends to distort the underlying relationship between the numerator and denominator of the ratio. For example, because of market imperfections, an employer often has difficulty in adjusting his staff immediately to changes in production. Sharp increases or decreases in demand usually are followed by erratic movements in productivity and unit labor costs. When longer periods are analyzed, however, these fluctuations tend to iron out and a secular trend is more apparent.

Long-term productivity trends tend to move more smoothly over time and present a more stable picture of historical patterns than short-term movements. The latter tend to reflect temporary changes in level of demand, utilization of productive resources, and other short-term phenomena, such as strikes, which affect current conditions but should not be expected to continue into the future. The period selected for analysis may affect these long-term trends, so that some element of judgment is present in any analysis of trend.

Indexes of output per man-hour, compensation per man-hour, and related cost data are published quarterly in the BLS press release, *Productivity and Costs*. Historical indexes of these data are available on request. Detailed procedures for developing output per man-hour indexes appear in *Trends in Output per Man-Hour in the Private Economy, 1909–58* (BLS

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[5] For manufacturing nonproduction workers, average hours are estimated as follows: Estimates of vacation time, holidays, paid sick leave, and personal time off are subtracted from an estimate of scheduled annual hours paid nonproduction workers; scheduled annual hours are derived by extrapolating the 1959 level of scheduled weekly hours with data from BLS *Area Wage Surveys*, and then multiplying by the number of workweeks in each year; the level of scheduled weekly hours for nonproduction workers was calculated from data collected by BLS for the study, *Employer Expenditures for Selected Supplementary Remuneration Practices for Production Workers in Manufacturing Industries, 1962*, BLS Bulletin 1428 (1965); estimates of vacation time, holidays, sick leave, and personal time off are derived primarily from data from Area Wage Surveys and Social Security Administration studies.

Bulletin 1249, 1959). Indexes of output per man-hour and related cost data appear in *Employment and Earnings*, the *Monthly Labor Review*, the *Handbook of Labor Statistics*, *The Economic Report of the President*, the *Manpower Report of the President*, and the *Statistical Abstract of the United States*.

Uses and Limitations

Data on output per man-hour, compensation per man-hour, and related costs are designed for use in economic analysis and public and private policy planning. These data apply in areas such as wage determination and analysis of prices and living conditions.

An especially relevant use of output per man-hour and related costs is the relationship of productivity, wages, prices, profits, and costs of production. Within the framework of national income and product accounting, gross national product for a specific time period represents the market value of all final goods and services produced or the sum of all costs of production—compensation, profits, depreciation, interest, etc. Unit labor costs, or compensation per unit of output, represent a major portion of total unit costs and reflect the combined effect of changes in output per man-hour and compensation per man-hour. An increase in hourly compensation tends to increase unit labor costs, and an increase in output per man-hour tends to reduce these costs. Therefore, through its relationship to unit labor costs, output per man-hour is a crucial element in the wage-price relationship. It indicates the extent to which compensation gains can occur without putting pressure on prices or reducing profits.

Certain characateristics of the output per man-hour and related cost data should be recognized when applying them to specific situations. First, the data reflect not only changes in various component industries but also changes in the relative importance of these industries. Second, these measures represent the culmination of a chain of economic events. Data for a single time period often do not show direct causal relations and should be interpreted in light of previous economic events as well as current conditions. Third, underlying concepts and data available for estimation limit to some extent measures of productivity, output, compensation, and employment. In fact, in several sectors where output data are difficult to obtain, output changes are equal to employment changes. This definition understates productivity growth. Consequently, the meaning of these measures should be interpreted with caution because of conceptual and practical limitations and statistical errors which can arise in any numerical series.

Technical References

Number

1. Edward Denison, *Why Growth Rates Differ; Sources of Economic Growth*, Washington, D.C., The Brookings Institution (1967).

   A study of output and productivity growth in 9 Western countries. Includes a discussion of factors affecting productivity growth and the way varying effects of these factors can be attributed to differential growth rates between countries.

2. Kendrick, John W., *Productivity Trends in the United States* (National Bureau of Economic Research, Number 71, General Series), Princeton, N.J., Princeton University Press (1961).

   A presentation of historical measures of output, input, and productivity for the U.S. economy and industry groups, including descriptions of concepts and methods of measurement. Also includes discussion of implications of productivity change for economic growth, prices, incomes, and resource allocation.

3. National Bureau of Economic Research, Conference on Research in Income and Wealth, "Output, Input, and Productivity Measurement, (*Studies in Income and Wealth*, Vol. 25), Princeton, N. J., Princeton University Press (1961).

   A collection of papers and comments devoted to an appraisal of the measurement of output, input, and productivity.

Technical References—Continued

4. National Bureau of Economic Research, Conference on Research in Income and Wealth, "Industrial Composition of Income and Product," (*Studies in Income and Wealth*, Vol. 32), New York, Columbia University Press (1968).

   A selection of papers concerning the development of output, input, productivity and cost measures for individual industrial sectors.

5. National Bureau of Economic Research, Conference on Income and Wealth, "Production and Productivity in the Service Economy," (*Studies in Income and Wealth*, Vol. 34) New York, Columbia University Press (1969).

   A collection of papers concerning the concepts, definitions, procedures, and data limitations of measuring output, input and productivity in service producing industries.

6. U.S. Department of Labor, Bureau of Labor Statistics, *Trends in Output per Man-Hour in the Private Economy, 1909–1958,* (Bulletin 1249, 1959).

   A presentation and analysis of output per man-hour indexes and trends for the total private U.S. economy and major sectors. Includes a description of methods and sources for developing output per man-hour measures.

7. U.S. Department of Labor, Bureau of Labor Statistics, *Productivity: A Bibliography* (Bulletin 1514, 1966).

   A collection of nearly 600 references concerning productivity and productivity measurement. Each reference includes a brief annotation giving the gist of the subjects covered.

8. Mark, Jerome A., *Wage-Price Guidepost Statistics: Problems of Measurement,* American Statistical Association, Proceedings of the Business and Economic Statistics Section (1968).

   A paper describing some of the problems of developing the measures which were used in the specification of the guideposts.

9. Ziegler, Martin, "Productivity in Manufacturing," *Monthly Labor Review*, October 1967.

   An analysis of the effect of changes in capacity utilization on productivity.

—SHELBY A. HERMAN

Chapter 26. Output Per Man-Hour Measures: Industries

Background

Studies of output per man-hour for individual industries have long been a part of the BLS program. The first Commissioner of Labor, Carroll D. Wright, conducted a study of 60 manufacturing industries in 1898. The findings in his report on "Hand and Machine Labor," provided striking evidence of the savings in labor resulting from mechanization in the last half of the 19th century. Commissioner Wright's study was prompted by concern on the part of Congress that human labor was being displaced by machinery. The impact of productivity advance upon employment remained an important focus of the BLS program throughout the 1920's and 1930's. It was also during this period after World War I that the Bureau began the preparation and publication of industry indexes of output per man-hour, based on available production data from the periodic *Census of Manufactures* and employment statistics collected by the BLS.

In 1940, Congress authorized the Bureau of Labor Statistics to undertake continuing studies of productivity and technological changes. The Bureau extended earlier indexes of output per man-hour developed by the National Research Project of the Works Projects Administration, and published measures for selected industries. This work was reduced in volume during World War II, owing to the lack of meaningful production and man-hour data for many manufacturing industries.

The advent of World War II also caused a change in program emphasis, from problems of unemployment to concern with the most efficient utilization of scarce manpower. The BLS undertook a number of studies of labor requirements for defense industries, such as synthetic rubber and shipbuilding. After the war, the industry studies program resumed on a regular basis, and was supplemented by a number of industry studies based on the direct collection of data from employers. Budget restrictions after 1952 have prevented the continuation of direct collection of data. Consequently, the preparation of industry measures is limited to those industries where readily available data can be utilized to construct measures.

In recent years, public interest in productivity has grown, and there has been greater recognition that increases in output per man-hour are important indicators of economic progress and the means to higher levels of income, rather than merely a threat to job opportunities.

The Industry Studies program covers a variety of manufacturing and nonmanufacturing industries. For these industries, indexes of output per man-hour, output per employee and the related data on output, employment, and man-hours are prepared and published on an annual basis. The indexes are generally available for most years from 1947 to the most recent year for which data are available, and for many industries also for 1939.

Concepts

Industry indexes of output per man-hour measure changes in the relationship between the physical volume of output of an industry and the man-hours expended in that output. Although, traditionally, output per man-hour has been the measure most frequently used, discussion of physical output per man-hour often is simplified if conducted in terms of its reciprocal: man-hour requirements per unit of output (unit man-hours). Therefore, this form of index is used in the following description.

For an industry producing a single uniform output, the unit man-hours index is simply the ratio of the man-hours expended to produce a unit of output over two periods of time. This ratio may be expressed as follows:

$$I_u = \frac{1}{I_p} = \frac{l_i}{l_o}$$

Where I_u represents the unit man-hour index, I_p represents the output per man-hour index, and l_i and l_o denote unit man-hours expended in the current and base periods, respectively.

For an industry producing a number of products—the more typical case—the unit man-hours index is the ratio for two periods of the total hours required for the output of a given composite of products. Indexes of such industries vary with the composite of products specified and can take many forms. Letting q_o and q_i represent base period and current period quantities of a given product, respectively, two of these forms are:

a. Using a current period composite

$$I_u = \frac{\Sigma q_i l_i}{\Sigma q_i l_o}$$

b. Using a base period composite

$$I_u = \frac{\Sigma q_o l_i}{\Sigma q_o l_o}$$

An index constructed according to (a) compares the man-hours expended in the production of the current composite with man-hours which would have been required to produce the current composite in the base period. An index constructed according to (b) compares the man-hours required in both periods to produce the base period composite. These indexes thus eliminate the effects of variations over time in the relative importance of products on unit man-hours.

In either form, an index of unit man-hours also can be viewed as the quotient of an index of man-hours and an index of output, i.e.,

$$\begin{array}{cccccc} & \text{Man-hours index} & \div & \text{Output index (Laspeyres)} & = & \text{Unit man-hours index (Paasche)} \\ \hline I_u = & \dfrac{\Sigma l_i q_i}{\Sigma l_o q_o} & \div & \dfrac{\Sigma l_o q_i}{\Sigma l_o q_o} & = & \dfrac{\Sigma l_i q_i}{\Sigma l_o q_i} \end{array}$$

$$\begin{array}{cccccc} & \text{Man-hours index} & \div & \text{Output index (Paasche)} & = & \text{Unit man-hours index (Laspeyres)} \\ \hline I_u = & \dfrac{\Sigma l_i q_i}{\Sigma l_o q_o} & \div & \dfrac{\Sigma l_i q_i}{\Sigma l_i q_o} & = & \dfrac{\Sigma l_i q_o}{\Sigma l_o q_o} \end{array}$$

The man-hours index measures the change in aggregate man-hours between the base and current periods. The man-hours data are the total hours expended by employees in establishments classified in the industry, in producing the base period and current period composites.

As can be seen in the formulas, the appropriate output index is one which compares the quantities of the various products in the current and the base periods, each weighted by the man-hours expended per unit produced in a given period. A current period weighted unit man-hours index employs a base period weighted output index divided into the man-hours index. Conversely, a base period weighted unit man-hours index is consistent with an output index which utilizes current period weights.

Methods and Sources

Output Per Man-Hour

The Bureau of Labor Statistics computes an index of output per man-hour by dividing an output index by an index of aggregate man-hours. Measures are prepared separately relating output to (a) all employee man-hours, (b) production worker man-hours, and (c) nonproduction worker man-hours. (The standard definitions of production workers and nonproduction workers are used.) Three corresponding measures also are computed relating output to the number of employees.

Output

BLS industry output indexes are based primarily on the physical output of the products of the industry combined with fixed period weights. However, the availability of quantity data on physical output varies among industries, and, for manufacturing and mining industries, may vary depending on whether the data are for a year when a Census was conducted or for a noncensus year. For manufacturing and mining industries, quantity data on physical output are usually most comprehensive for years covered by a Census. To make maximum use of the comprehensive census data, output indexes are derived from data for two consecutive censuses; these indexes are referred to as benchmark indexes. For intercensal years, annual indexes are based on either physical output data (generally, in less detail than for Census years) or if such data are not available, value of output adjusted for price change (i.e., the value of output in constant dollars). The annual series subsequently are adjusted to the benchmark levels for the census years.

Weights. The mathematical form of the output index implies use of unit man-hour weights, and such weights are used whenever possible. These weights are derived from special surveys or from data published for specialized establishments in the *Census of Manufactures.* In some industries, however, unit man-hour information is not available for individual products. Consequently, the BLS uses substitute weights which are assumed to be proportional to unit man-hour weights. Usually these are unit value weights. Unit value weights are computed from Census or survey data on the quantity and value of shipments of the primary products of the industry. The introduction of these substitute weights results in an industry output per man-hour index which reflects shifts in value per man-hour of the various products in the industry. Thus, a change can occur in the index without any change in the output per man-hour for any product of the industry.

The extent to which error or bias may be introduced by the use of unit value weights is not known. The index is equivalent to one weighted with unit man-hours if the unit man-hours and unit values among the products are proportional or if there is no correlation between the relative change in quantity and value per man-hour[1] There is evidence that unit values are fairly reliable approximations for individual products where wages constitute a large proportion of total value of output. The error generated in the output index by an error in the weights is generally considerably smaller than the error in the weights themselves.

In some industries, unit value weights for specific products and unit man-hour weights for product groups are used at different stages in constructing the industry output indexes. When this procedure is used, the individual products are first aggregated into primary product group indexes with unit value weights. These indexes in turn are combined into an industry output index with primary product group man-hours. The primary product group man-hours relate to a base period, as do value weights.

To obtain primary product group man-hour weights, total man-hours for plants specializing in each primary product class are derived from published census data on production worker man-hours and nonproduction worker employment. These are supplemented by unpublished BLS estimates of nonproduction worker man-hours. (See page 223 for the procedures used to estimate nonproduction worker man-hours.) Ratios of man-hours to value of shipments are multiplied by the corresponding value of primary products shipped by the entire industry to yield the estimated primary product group man-hour weights. This procedure assumes that the man-hours per dollar for each product class shipped by the whole industry are the same as those for plants specializing in the product group. This procedure is used only when the "specialization" and "coverage" ratios of the industry are high and specialization data for all or most of the product groups are available.[2]

Most published industry indexes have used 1947 weights for 1947–58, 1958 weights for 1959–63, 1963 weights for 1964–67, and 1967 weights for years after 1967. The Bureau policy is to revise the weights as more current data become available from the periodic censuses.

Benchmark indexes. For most manufacturing and all mining industries, indexes reflecting changes in output between census years are constructed. These are called benchmark indexes.

For manufacturing industries, benchmark indexes are developed using the following procedure: Price indexes for each primary product class are developed from data on the value of each individual product within the class whether made in the industry or elsewhere. Wholesale price indexes are used wherever possible to convert the product values to constant dollar estimates. If a wholesale price index is not available, a price index is developed using both the quantity and value data reported for the product in the *Census of Manufactures*. The primary product class price indexes are derived from the sum of the current dollar values and the sum of the constant dollar values.

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[1] See Irving H. Siegel, "Further Notes on the Difference Between Index Number Formulas," *Journal of the American Statistical Association*, December 1941, pp. 519-524.

[2] The "specialization ratio" is the value of shipments of primary products of plants in the industry as a percent of total shipments of all products (primary plus secondary) made by these same establishments. The "coverage ratio" is the value of shipments of the primary products made by plants classified in the industry as a percent of the total shipments of the industry's primary products made by all producers, both in and out of the specified industry.

These "wherever made" primary product class price indexes are used to deflate the value of primary products produced only by the industry. This procedure assumes that the price movements of the primary products within the industry are the same as the price movements for all primary products wherever made. These constant dollar values are related to corresponding base year values in order to derive separate primary product indexes within the industry.

These separate primary product indexes in turn are combined with man-hour weights to derive the total industry primary product output index. The index of primary products of the industry is multiplied by a "coverage" adjustment to represent the total output of the industry. This "coverage" adjustment is the ratio of the index of value of industry shipments (after inclusion of net additions to inventories) to the index of value of shipments of primary products. The final industry output index thus reflects inventory buildups and changing proportions of secondary products.

For the mining industries, benchmark indexes are computed from unweighted tonnage data as reported in the Census of Mineral Industries.

Annual Indexes: Annual output indexes are constructed by the following described procedures. For manufacturing and mining industries, the annual indexes are adjusted, if necessary, to the levels of the benchmark indexes previously described. The adjustment factors for 2 census years are used to determine the adjustment factors for the intervening years by linear interpolation.

1. *Physical output.* Most annual output indexes are based on physical quantities of products combined with fixed-period unit manhour or unit value weights. The basic quantity data are generally primary products of an industry classified into product groups; the greatest amount of detail available is used. The quantity data relate to primary products "wherever made" and in some cases to shipments of the products.

The Bureau's annual measures of production are constructed from data on physical quantities of products comprising a high percentage of the total value of an industry's output. Coverage varies between 60 and 100 percent. Complete coverage generally is obtained in mining and other well-defined industries with a relatively homogeneous output.

2. *Deflated value.* When adequate annual physical quantity data are not available, indexes are derived from data on the value of industry output, adjusted for price change. Since the adjustment for price change is most often downward, the indexes usually are called "deflated value" indexes. Such indexes are conceptually equivalent to indexes which use data on physical quantities of products combined with unit value weights. To derive this index, data on the industry's value of output are divided by an industry price index. An index of these deflated values shows the change in the real value of output between the past and current periods.[3]

Often data on value of production are not available and data on value of shipments must be used. In this case, data on value of shipments for each year are divided by an industry price index representing the average annual price for the year. Beginning- and end-of-year finished goods and work in process inventories are also deflated. The estimated value of shipments in constant dollars is then adjusted by the net change in inventories, also in constant

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[3] For example:

Value Index ÷ Price index (Paasche) = Output index (Laspeyres)

$$\frac{\Sigma p_t q_t}{\Sigma p_o q_o} \div \frac{\Sigma p_t q_t}{\Sigma p_o q_t} = \frac{\Sigma p_o q_t}{\Sigma p_o q_o}$$

where p_t and p_o represent prices of products in the industry in the current and base periods, respectively. This index requires quantities of all items produced in each year. These data are not available for the particular industries where this measure is used, and quantity data are usually available for the base year only, so that the deflated value indexes employed usually take the following form:

Value Index ÷ Price index (Laspeyres) = Output index (Paasche)

$$\frac{\Sigma p_t q_t}{\Sigma p_o q_o} \div \frac{\Sigma p_t q_o}{\Sigma p_o q_o} = \frac{\Sigma p_t q_t}{\Sigma p_t q_o}$$

dollars, to yield an estimate of the constant dollar value of production.

Sources. Industry output indexes are prepared from basic data published by various public and private agencies, using the greatest amount of detail available.

The Bureau of the Census, U.S. Department of Commerce, is the major source of output statistics for the manufacturing industries. The Bureau of Mines, U.S. Department of the Interior, compiles most of the information for the mining, cement, coke, and metals industries. Other important Government sources include the U.S. Department of Agriculture, the Fish and Wildlife Service, U.S. Department of the Interior, the Interstate Commerce Commission, the Internal Revenue Service, and the Civil Aeronautics Board. Important sources of trade association data include the Textile Economics Bureau, Inc., National Association of Hosiery Manufacturers, Inc., National Canners Association, Rubber Manufacturers Association, and the American Iron and Steel Institute.

For deflated value series, industry price indexes are derived from wholesale price indexes published by the Bureau of Labor Statistics.

Man-Hours

An index of man-hours is computed by dividing the aggregate man-hours for each year by the base-period aggregate. Man-hours are treated as homogeneous and additive with no distinction made between hours of different groups of employees. Data on changes in qualitative aspects of man-hours, such as skill, efficiency, health, experience, age, and sex of persons comprising the aggregate, are not used and generally not available. Man-hours indexes are developed for all employees, production workers, and nonproduction workers.

Sources. Industry employment and man-hours indexes are developed from basic data compiled by the Bureau of Labor Statistics or the Bureau of the Census. For most private nonagricultural industries (including manufacturing), the Bureau of Labor Statistics publishes employment and average weekly hours data for production or nonsupervisory workers and employment data for all employees. For manufacturing industries, the Bureau of the Census publishes employment and aggregate man-hours data for production workers and employment data for all employees (including nonproduction workers). The Bureau of the Census provides data in greater industry detail within manufacturing than BLS.

The two sources differ in their definition of man-hours. The Census data include all hours at the plant, worked or paid for, and exclude paid time for vacations, holidays, or sick leave, when the employee is not at the plant. Overtime and other premium pay hours are included on the basis of actual time at the plant. In contrast, the Bureau of Labor Statistics data include time for paid vacations, holidays, and sick leave, as well as plant man-hours. Differences in the data from the two sources for the same industry, however, also stem from sampling and reporting differences.

Whenever employment and hours data are available from both the Bureau of the Census and the Bureau of Labor Statistics, the labor input data which are used are those consistent with the data on output. Thus, when output data from the Bureau of the Census are used, employment and hours data from the same source usually are preferred.

Nonproduction Worker Hours. While both the Bureau of the Census and the BLS provide data on production worker man-hours, neither source provides annual data by industry on nonproduction worker nor all-employee man-hours. Therefore, these measures are estimated.

The estimates of aggregate nonproduction worker man-hours for the manufacturing industries are derived from published employment data, and estimates of average annual hours worked or paid per nonproduction worker.

The estimates of average annual hours worked are calculated by multiplying the number of work-weeks in the year times the scheduled weekly hours. This produces an estimate of average annual hours paid. Estimated hours for vacations, holidays, disability, and personal time off are subtracted from average annual hours paid, to obtain an estimate for average annual hours worked.

Vacation and holiday trends are based on data from various BLS surveys. Estimates of disability time are based on studies of the Department of Health, Education, and Welfare, and data from BLS surveys. Personal time off has been estimated as a constant from references in relevant publications.

All employee man-hours estimates for manufacturing industries are derived by summing the aggregate man-hours for production workers, and the estimated aggregate man-hours for nonproduction workers.

Comparability of Output and Man-Hours Data

Man-hours data are based on total man-hours of establishments classified in an industry, whether the man-hours are applied to production of primary or secondary products. Annual physical output data, on the other hand, usually include only primary products of an industry. In addition, they are usually reported on a "wherever made" basis. Thus, there can be some discrepancy in the coverage of output and man-hours measures. This is not a serious problem unless there is considerable variation from year to year in the proportion of primary products to total products of an industry, or if there is change in the proportion of primary products which are made in other industries. The comparability of the man-hours and output data is indicated by the specialization and coverage ratios which the Bureau of the Census publishes. All industries in the BLS industry measurement program have high specialization and coverage ratios.

In selecting industries for the measurement program, attention is also given to changes in the degree of vertical integration. Man-hours relate to all operations performed by establishments of an industry, while output usually is measured in terms of the final product. If establishments undertake additional operations, such as the manufacture of components which had previously been purchased from suppliers, man-hours will increase but there will be no corresponding increase in final output. Thus, output per man-hour indexes would be biased. In developing industry indexes, the BLS examines data such as the ratio of cost of materials to value of shipments for any indication of a change in the degree of vertical integration.

Presentation

BLS indexes are published annually in the form of a bulletin, *Indexes of Output Per Man-Hour, Selected Industries*. As new industry indexes are developed, they are presented as articles in the *Monthly Labor Review*. The articles contain an analysis of productivity, output and employment trends in the industry. Technical notes describing the methodology used to develop the indexes are available on request.

Indexes of output per man-hour also are published in the *Statistical Abstract of the United States* and in the *Handbook of Labor Statistics*. Some indexes for earlier years are published in *Historical Statistics of the United States*.

Uses and Limitations

Industry measures of output per man-hour are particularly useful for studying changes in manpower utilization, projecting future manpower requirements, analyzing trends in labor costs, comparing productivity progress among countries, examining the effects of technological improvements on employment and unemployment, and analyzing related economic and industrial activities. Such analysis usually requires that indexes of output per man-hour be used in conjunction with other industry data. For example, to study technological effects, related data on production and employment are useful; to study trends in labor costs, data on earnings and other labor expenditures are necessary.

Although the measures relate output to one input—labor time—they do not measure the specific contribution of labor, capital, or any other factor of production. Rather, they reflect the joint effect of a number of interrelated influences such as changes in technology, capital investment per worker, utilization of capacity, layout and flow of material, skill and effort of the work force, managerial skill, and labor-management relations. Also, indexes which relate output to one group of employees represent the total output of the industry resulting from all employees and do not represent the specific contribution of that group of employees.

These industry measures of output per man-hour are subject to certain qualifications. First, existing techniques cannot fully take into account changes in the quality of goods and services produced. Second, although efforts have been made to maintain consistency of coverage between the output and labor input estimates, some statistical differences may remain. Third, changes in the degree of plant integration and specialization often are not reflected adequately in the production statistics. This may result in overstatement of productivity gains in some years, understatement in others. Fourth, indexes involving nonproduction worker man-hours are subject to a wider margin of error than are the indexes using production worker man-hours because of the technique for estimating average man-hours of nonproduction workers. Errors in estimating man-hours for nonproduction workers, however, have a relatively insignificant effect on the estimates of man-hours for all employees. Fifth, year-to-year changes in output per man-hour are irregular, and, therefore, not necessarily indicative of basic changes in long-term trends. Conversely, long-term trends are not necessarily applicable to any one year or to any period in the future. Because of these and other statistical limitations, these indexes cannot be considered precise measures; instead they should be interpreted as general indicators of movements of output per man-hour.

Technical References

Number

1. Dunlop, John T. and Diatchenko, V. *Labor Productivity* (New York, San Francisco, Toronto, London: McGraw-Hill Book Company, 1964).
   An international collection of papers presented by participants of the conference on labor productivity held at Cadenabbia, Lake Como, Italy, in 1961. Papers cover concepts and measurements of productivity; international comparisons of productivity; wages and productivity; and technical, managerial, and organizational factors affecting productivity.
2. European Productivity Agency, Organization for European Economic Co-operation, *Productivity Measurement*, Volume I (Concepts) Prepared by G. Deurinck. Paris, August 1955, Project No. 235.
   The following listed essays are included: The Concept of Productivity and Its Corollaries; Alternative Productivity Concepts; Aspects of Productivity Measurement and Meaning; The Role of Official Statistics in Measuring Productivity; Productivity, Efficiency and Wages; and Indices of Industrial Efficiency.
3. Evans, Duane and Siegel, Irving H. "The Meaning of Productivity Indexes," *Journal of the American Statistical Association*, March 1942, pp. 103–111.
   The nature, use, and limitations of productivity indexes.
4. Fabricant, Solomon. "Of Productivity Statistics: An Admonition," *Review of Economics and Statistics*, November 1949, pp. 309–311.
   The deficiencies and limitations in productivity measurement.
5. Greenberg, Leon. *Data for Measurement of Industrial Productivity in the United States*, U.S. Department of Labor, Bureau of Labor Statistics, 1965.
   A review of the status of available statistical data and determination of what gaps exist in order that improvements can be made.
6. International Labour Office. *Measuring Labor Productivity*, Geneva, 1969. Discusses methodology and problems in the measurement of productivity, analysis of national series and international comparisons of productivity measures.
7. Kendrick, John W., *Postwar Productivity Trends in the United States, 1948–69*, National Bureau of Economic Research, forthcoming.

Technical References—Continued

Presents trends in productivity by industry groupings from 1948–66 with preliminary estimates through 1969. Long term trends, patterns of productivity growth and interrelationships among variables are analyzed. Also included are descriptions of concepts, methods and sources.

8. Klotz, Benjamin P., *Productivity Analysis in Manufacturing Plants*, U.S. Department of Labor, Bureau of Labor Statistics, 1970.

   An econometric analysis of industry production functions derived from data for over 1700 plants.

9. Klotz, Benjamin P. and Herman, Shelby A., *Productivity in the Railroad Industry, U.S.* Department of Labor, Bureau of Labor Statistics, March 1970.

   An analysis of productivity in the railroad industry using econometric techniques.

10. Mark, Jerome A. "Industry Indexes of Output Per Man-Hour," *Monthly Labor Review*, November 1962, pp. 1269–1273.

    A description of the methodology used in the construction of Bureau of Labor Statistics indexes of output per man-hour. Covers methods and sources, construction of production and man-hour indexes, and limitations.

11. National Bureau of Economic Research, Conference on Research in Income and Wealth. *Output, Input, and Productivity Measurement*, Volume 25 of *Studies in Income and Wealth*, Princeton, N.J., 1961.

    A collection of papers and comments devoted to an appraisal of the measurement of output, input, and productivity.

12. Siegel, Irving H. *Concepts and Measurement of Production and Productivity*, Working Paper of the National Conference on Productivity, 1952.

    The rationale and techniques of measurement of changes in the physical volume of production and the level of productivity. Includes an extensive bibliography on production and productivity measurement.

13. U.S. Department of Labor, Bureau of Labor Statistics. *Indexes of Output per Man-Hour, Motor Vehicles and Equipment industry*, 1957–66, December 1968.

    A study of productivity trends in the motor vehicles and equipment industry. Contains a detailed technical note describing the methodology used to derive the measures.

14. United Nations. *Index Numbers of Industrial Production*, Series F, No. 1 of Studies in Methods, New York: 1961.

    Deals with the more technical aspects of compiling production indexes.

15. *Productivity: A Bibliography* (BLS Bulletin 1226, 1958) and (BLS Bulletin 1514, 1966).

    Two collections of annotated references concerning productivity and productivity measurement.

—CHARLES W. ARDOLINI, ARTHUR S. HERMAN, AND JOHN L. CAREY

Chapter 27. Technological Change

Background

Studies of technological changes and their labor implications have been undertaken by the BLS over the years for a variety of purposes. During the 1930's, public interest focused on the unemployed and reports were prepared on technological changes and displacement of workers in various industries. During World War II, emerging technologies were studied for purposes of improving manpower utilization.

Beginning in the mid-1950's, nationwide attention was focused on the implications of new developments classified under the general term "automation." The BLS made a series of studies on a plant basis, in the insurance, petroleum refining, bakery, air lines, and electronics industries, to explore the manpower implications of various changes. Later, broader studies were undertaken, including a survey of manpower impacts of changeover to electronic computers in 20 large companies and intensive studies of technological change in the coal and paper industries.

These studies formed the basis, beginning in the early 1960's, for a more systematic investigation of future changes. Research now underway pinpoints technologies which will become increasingly important over the next decade in key industries and attempts to provide advance information about their manpower implications.

Description of Studies

The Bureau's research program on technological change involves a variety of reports and studies of different degrees of detail and approach. The current program thus provides detailed case studies of changes within a single plant or office; summary reports surveying trends in major industries; detailed industry studies; and studies of major technological innovations, such as computers, that affect workers in different industries.[1]

Case Studies

BLS case studies provide detailed information on various aspects of adjustments made to technological change. The framework of such studies is a single plant or office. A typical case study covers such topics as: management's objectives and results of introducing technological change at the plant or office; exent of displacement and reassignment of employees; practices regarding transferring, retraining, and selecting employees for new occupations; characteristics of employees whose jobs were eliminated and who were assigned to new positions; and implications of automation for older employees. Both qualitative and quantitative data are presented.

The case study approach has also been used to investigate in detail special aspects of adjustments to technological change. Among the topics covered by case studies are: the performance of older workers in industry retraining programs, as shown in four plants in different industries; manpower planning procedures followed in connection with a series of technological changes at a public utility and in telephone offices; the adjustments to electronic data processing in a government agency; experience under an adjustment program in the railroad industry; post-layoff work experience of displaced workers in plants in different industries and regions; and job redesign for older workers at different plants. In these studies, information about single plants is presented, as illustrative, rather than as representative cases.

Reviews of Technological Trends in Major Industries

To provide a broad overview of significant trends in the economy, the Bureau prepares a summary report, applying to key industries on new types of machinery, processes and products which are believed likely to have an important effect over the next 5 to 10 years. The industries covered comprise a cross section of the economy and include those where the pace may be slow as well as those where change is rapid. The first version of this report, entitled *Technological Trends in 36 Major American Industries*, was issued by the President's Advisory Committee on Labor-Management Policy in 1964. A revised edition covering 40 industries was published in 1966.[2]

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[1] For discussion of various research methods used in studying automation, see technical references 1 and 2.

The emphasis of the report is on technological developments within each industry in an early stage of the innovation's commercial use—i.e., the period after introduction on the market but before widespread adoption. Inventions and discoveries still in the "drawing board" stage are considered unlikely to have as much impact over the next decade as those already tested and are generally not discussed.

The report briefly describes recent technological developments, indicating insofar as practicable some economic advantages of various types of new equipment, processes or products; their importance in terms of the man-hours engaged in the operations affected; estimated extent of use currently and in 5 to 10 years, and some factors affecting adoption such as the volume of investment and expenditures for research and development. The advantages described include not only labor savings per unit, but also quality improvements, fuel and material economies, greater accuracy, new markets, etc.

In assessing the employment implications of technological changes, account is taken of the possible rate of growth in output per man-hour and in the industry's total output. Appraisal also is made of the changes in occupational structure and of some issues and examples of adjustment that are taking place.

Outlook Reports on Industry Technological Trends

Intensive studies are made of selected major industries where far reaching changes, on a large scale, are taking place, such as coal, railroads, and textiles. These studies involve detailed analysis of the economic implications of major technological developments within individual industries. Factors analyzed include investment trends and factors affecting the prospects for the diffusion of recent technological advances, such as the structure of the industry. Estimates are developed of the displacement of present by new methods over the next 10 years. Unit labor requirements under new and old technologies are compared, wherever possible. Since the focus of the study is on the industry as a whole, data on recent industry trends in output per man-hour, production, and employment are examined in relation to long-term trends and projections of future trends are developed.

Technological Innovation Studies

Some technical innovations have applicability in many industries. Among these are such developments as computers, numerical control of machine tools, materials handling equipment, and control instruments.[3] Because of their far reaching impact, special studies have been made of the nature, status, prospects for adoption, and implications for unit labor requirements, occupational change training needs, and problems of industrial relations. In analyzing their impact in different industries, differences as well as similarities are revealed.

Data Sources and Collection Methods

A variety of data sources and collection methods are utilized in making studies of technological change and its impact.

Personal Interviews

In making case studies, analysts personally conduct intensive interviews with plant managers, personnel directors, and other officials who have direct knowledge of changes at their plant. Union officials at the plant, and in some cases, individual workers are interviewed. The analyst uses a checklist of questions in conducting informal interviews in order to elicit the maximum amount of data. Plants and offices included in these studies are selected on the basis of having recently made a major change in their equipment, products, or methods of production.

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[2] See technical reference 12.

[3] See technical references 9, 10, and 12.

Personal interviews also are utilized to help determine industry trends. Informal interviews are conducted with engineers, scientists, economists, and other experts in companies which produce and use new technology, unions, trade associations, government agencies, universities, etc., who have specialized knowledge of particular technological development of industry trends. One objective in these cases is to obtain their expert judgment about the nature, pace of introduction, and possible impact of developments with which few plants have had any experience. The emphasis in these interviews is on the technological change rather than on experiences in adjusting.

Trade and Technical Publications

Important sources of information concerning technical trends are trade journals, technical magazines and books, conference proceedings, government hearings, and company reports. Annual reports of leading corporations and company house organs often contain useful information on current technical development in some industries. In making studies of industries, these publications are reviewed to obtain information about the status and prospects of important developments and to ascertain which companies and plants merit more intensive field visiting. Reports and publications of firms that produce particular types of equipment often are found useful in studies of industries that use such equipment.

Statistical Data Sources

Quantitative information about the status of specific technological developments is fragmentary and scarce. The Bureau makes use of available data from many public and private sources. These sources include, for example: Office of Management and Budget; annual inventory of computers in the Federal Government; Business and Defense Services Administration: annual survey of numerically controlled machine tools; McGraw-Hill Company: survey of computers in industry; American Bankers' Association: survey of banking automation; *American Machinist Magazine:* inventory of metalworking machinery; and Bureau of Mines: annual reports on mining equipment.

Statistical information on industrywide trends are useful in analyzing the economic implications of technological change. Among the important sources used in preparing studies are the Bureau's indexes of output per man-hour and related series on production, employment and hours; the Bureau of Census data on expenditures on plant and equipment; and the National Science Foundation's estimates of research and development.

Mail Surveys

Because of the complexity of the subject, relatively little use has been made of mail surveys in studying the impact of technological change. This technique, however, is useful in obtaining information on a broad scale not otherwise available, to supplement detailed information collected through case studies. Thus, to determine the extent and manpower impact of computer use in the insurance industry, the Bureau conducted a two-part survey of 400 companies employing most of the employees in the industry.[4] In the first stage, a brief, 1-page questionnaire covering data on employment and extent of computer use was sent to a group consisting of all large offices, and a sample of small companies. From information received from this screening questionnaire a number of companies were selected to whom a more detailed questionnaire was sent, asking for information about computer uses, number of employees engaged in electronic data processing, planned applications, etc.

The mail survey technique also was used in followup surveys of workers who have been laid off as a result of technological and economic change.[5] The names and addresses of such workers were obtained from plant personnel records, selecting only a sample in cases where a large number of workers had been displaced. The questionnaire was mailed at least 6 months after the layoff occurred, in order to allow a period of time for some adjustment to take place. Information collected from the mail survey dealt with the personal characteristics of displaced workers such as age, sex, occupation, level of education and skill, post-layoff work experience, such as labor force status at time of survey, type of job held after layoff, source of jobs, etc.

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[4] See technical reference 5

[5] See technical reference 4.

Plant Records

In making detailed studies of the impact of technological change on individual workers within a plant, analysts sometimes can obtain from employers' files, data on such aspects as the age, sex, and related personal characteristics of employees whose jobs are eliminated and the jobs in the plant held by each individual affected before and after the change; similar data are collected on individuals who are selected for the positions created in connection with automated equipment.[6]

Expert Review

In preparing forecasts of future technological trends, a critical step is the review of preliminary reports with outstanding experts in each industry.[7] Drafts of industry reports are mailed to company executives, union research directors, trade association officials, technical journal editors, and university and government specialists for their assessment of the validity and adequacy of projected trends. Over 450 persons were contacted in this way in the preparation of a report on technological trends in major industries. Some experts are visited personally to review draft statements in detail. Through this means, reports on technological prospects are designed to reflect, as much as possible, the authoritative views of a number of persons who have expert, first hand knowledge of each industry.

Analysis and Interpretation

For a better understanding of research results in this field, it is important to keep in mind the meaning of certain key ideas and concepts. Some of the key problems of interpretation and analysis in this type of research are therefore set forth, briefly.

Definition of Technological Change

Technological change is defined broadly in the BLS studies, as encompassing significant changes in processes and equipment, products and services produced, and materials, fuels, and energy used. The term "automation," which is sometimes popularly used as a synonym for "technological change," designates, strictly speaking, a particular type of current development. It has been variously defined, for example, as "automatic operation," "the mechanization of sensory, control and thought processes," and "a concern with production processes as a system."

While BLS studies have been concerned with developments in "automation," particularly in anticipating long-term trends in the future, they are not the only technological changes taking place that affect labor requirements and industrial relations. For example, new ways of generating power, piggybacking in transportation, use of synthetic materials in manufacturing, mechanized methods of materials handling, and faster steelmaking processes are important technological developments, not usually covered by technical definitions of "automation," but having significant manpower implications.

Impact on Productivity

Since one of the principal consequences of technological change, so far as manpower utilization is concerned, is an increase in productivity—i.e., output per man-hour, special attention is given in BLS studies to analyzing changes in industrial productivity. Such trend analysis is a useful method of measuring the pace of technological change. Changes in productivity, however, also reflect changes in capacity utilization and many other nontechnical factors; it is important to recognize that the productivity trend is only a partial measure of the rate of technological change.

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[6] See technical references 1 and 6 for use of plant records.

[7] See technical reference 12 for further detail.

In determining the impact of a specific technology, BLS studies try to indicate the reduction in unit labor requirements that the new processes are designed to achieve. In some cases, estimates of labor savings are derived on the basis of comparisons with the estimated average technology of the industry under study; in others, with the best equipment that is available: or in actual plant studies, with the technology that is actually displaced.

It is also important to distinguish between the impact on productivity of the operation directly affected and on productivity of the plant as a whole. An advanced machine tool, for example, may result in a relatively large reduction in unit labor requirements in the machining operation, but would have little impact on finishing, and assembling, and may even require additional labor in engineering and maintenance work.[8] The impact on plant productivity, therefore, would be considerably less than the effect on productivity of any department or operation directly affected.

Impact on Employment

In assessing the impact of technological change on employment, it is necessary to consider the implications of plant manpower policies and the effects of economic changes, with which technical changes interact. Analysis of the impact of technological change purely in terms of machinery is incomplete.

At the plant level, for example, the substitution of machinery for labor may substantially reduce job opportunities in operations directly affected. If efforts are made, however, to eliminate these jobs by not filling vacancies created by quits, deaths, and retirement of employees, or by transfer of affected workers to other positions in the plant or office, labor savings could be achieved without displacing the workers affected from the plant.

Moreover, the employment impact of technical change is also interrelated with the effects of the business cycle. Thus, workers whose jobs are eliminated by technical changes may not be displaced from a plant until a decline in demand results in layoffs—a long time after the change has been made in some cases. In the subsequent recovery, however, they may not be hired back because their jobs no longer exist.

Since many changes exert their effects on employment through the competitive market, the employment trend for the industry as a whole must also be examined. The plant which reduces its unit costs through technological improvement may be able to gain a larger share of the market and increase its employment, but at the expense of the less technically advanced competing plants, which may be forced to shut down, displacing workers far from the location of the change.

Because of the whole complex of economic factors that operate through the market, including changes in demand, location, foreign competition, merger, and consumer taste, it is very difficult to isolate the expanding and displacing effects of technological change.

Impact on Occupations

Two aspects of occupational change resulting from technological changes are examined. Changes in job structure—the distribution of the plant or office work force by function or broad skill grouping—are studied to determine the extent of upgrading or downgrading. Since the content of jobs may be altered as a result of changes in equipment or processes, attention also is directed to intensive before-and-after analysis of job duties and the knowledge and abilities required to perform these duties as indicated by job descriptions and observation. The content of newly created jobs, such as programmer, also is studied and the qualifications required and personal characteristics of individuals selected for these new positions are described, so far as possible.[9]

Adjustments to Technological Change

Technological change has important implications for personnel management and collective bargaining within plants. The introduction of new machinery, products, or processes often requires movement of workers among jobs within the plant or office by transfer or promotion, the setting of wage rates, and selection of persons for new jobs. Often the adjustment proceeds according to rules established in advance through collective bargaining. Provisions to assist workers whose jobs are eliminated include severance pay, retraining, and early retirement. Besides analyzing the operation of formal provisions under collective bargaining, Bureau studies describe informal efforts to provide training, to utilize attrition, and to obtain jobs for displaced workers elsewhere.[10] The limitations of these measures as well as their advantages are important matters studied.

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[8] See technical reference 10 for further discussion.

[9] See technical references 1, 6, and 10.

Uses and Limitations

BLS studies of technological change are prepared as part of the U.S. Department of Labor's program for carrying out the objectives and responsibilities of the Manpower Development and Training Act. Under this act, the Secretary of Labor is required "to establish techniques and methods for detecting in advance the potential manpower impact of automation, technological progress, and other changes in the structure of production." As part of such an early warning system, BLS studies and reports of technological change are useful to managers, union leaders, educators, economists, government officials, and others in planning policies to cushion the impact of change. The study of emerging technological trends and possible implications, moreover, provides a basis for more valid projections of productivity and economic growth. They also are useful in pinpointing manpower problems and determining the most productive direction of future research to obtain possible solutions.

Some limitations of the Bureau's studies of technological change must be kept in mind in assessing their appropriateness for particular uses. In general, it is important to recognize that judgments about the future direction and pace of technological change and its implications are necessarily complex and difficult. The rate of introduction of new technology depends not only on technical advantages but also on many economic factors, such as the volume of investment, market prospects, and the availability of trained workers, all of which are subject to significant variations. Moreover, since the period of introduction generally spans a number of years, new developments are constantly appearing so that assessments of the outlook must be reappraised from time to time in the light of new information.

Finally, studies of the impact of technological change deal primarily with changes within individual industries. But these changes often involve changes in the type and amount of goods and services purchased from other industries and could therefore have important implications for production and employment in industries supplying inputs. The accumulation of information on interindustry relationships, through the Bureau's economic growth studies, will provide a quantitative basis for analyzing this aspect of technological change.

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[10] See technical references 1 and 6 for further discussion.

Technical References

Number

1. *Adjustment to the Introduction of Office Automation,* (BLS Bulletin 1276, 1960).
   A study of manpower implications of the installation of electronic data processing in 20 offices in private industry, with special reference to older workers. Discusses problems of measuring impact of electronic data processing on employment and occupational requirements.
2. *Automation: A Discussion of Research Methods,* Labour and Automation Bulletin No. 1, Geneva, International Labour Office, 1964.
   Fourteen papers on problems of research methods in studying manpower impact of automation at the plant and industry level.
3. *Automation and Technological Change* (edited by John T. Dunlop). The American Assembly, Columbia University, Englewood, N.J., Prentice-Hall, 1962.
   Case studies of psychological impact are summarized in Chapter 3, by Floyd C. Mann. Chapter 7, "Employment," by Ewan Clague and Leon Greenberg, discusses problems of measuring employment impact.
4. *Case Studies of Displaced Workers,* BLS Bulletin 1408 (1964).
   Studies of post-layoff experiences of nearly 3,000 workers formerly employed at five different plants. Discusses use of mail questionnaire in followup of displaced workers.
5. *Impact of Office Automation in the Insurance Industry,* (BLS Bulletin 1468, 1966).
   Mail survey of over 400 insurance companies. Covers extent, pace, and employment implications of electronic data processing.
6. *Impact of Office Automation in the Internal Revenue Service,* (BLS Bulletin 1364, 1963).
   Detailed case study of large-scale changeover to electronic data processing. Illustrates use of internal personnel records in analyzing effects of office automation.
7. *Industrial Retraining Programs for Technological Change,* BLS Bulletin 1368 (1963).
   Four case studies of experience of older and younger workers in industrial retraining programs, based on plant records. Discusses some problems of measuring comparative performance.
8. *Manpower Planning for Technological Change—Case Studies of Telephone Operators,* (BLS Bulletin 1574, 1968).
   Case studies of the manpower policies and experiences of several telephone companies in cushioning the impact of technological change on their employees.
9. *Outlook for Computer Process Control,* (BLS Bulletin 1658, 1970).
   A study of manpower implications of the introduction of computers to control production processes in six process industries.
10. *Outlook for Numerical Control of Machine Tools,* (BLS Bulletin 1437, 1965).
    A study of manpower implications of a key technical innovation affecting metalworking industries. Discusses problem of generalizing about change in productivity as result of specific change.
11. *Technology and Manpower in the Textile Industry of the 1970's,* (BLS Bulletin 1578, 1968).
    A study of the changes in technology in this major industry, and the impact of productivity, employment, and occupational requirements.
12. *Technological Trends in Major American Industries,* (BLS Bulletin 1474, 1966).
    Description of outlook for major technological developments based on a variety of data sources and expert review.

—EDGAR WEINBERG

Chapter 28. Construction Labor Requirements

Background

New construction is a major component of the Nation's output of goods and services and a major source of employment. The jobs it creates occur not only at the site of employment, but also in the many manufacturing, trade, transportation, and service industries which furnish the materials and services required in the construction process. Because of this far-reaching employment impact, the creation of new construction projects often is regarded as a means of counteracting cyclical unemployment.

To assist in assessing the extent of the impact of construction expenditures on employment, a series of labor and material requirements studies for different types of construction was started in 1959. The program was established as a result of Congressional legislation, requiring the Bureau of Labor Statistics to provide estimates of the amount of total employment generated directly and indirectly by various kinds of construction per dollar of expenditure.

Earlier Bureau efforts to relate employment and volume of construction included the "Labor Required for New Construction" series, with reference mainly to on-site man-hours. This series, started in the early thirties, appeared intermittently through the years, but was not based on actual up-to-date surveys and was finally halted in the mid-fifties because the factors employed were found to be obsolete. There was also a series of Public Works Administration studies published in 1940, covering Federal public works projects constructed in the mid-thirties; and a few individual studies of specific types of construction.

The present studies include the major types of building construction (schools, hospitals, public and private housing, etc.) and also heavy construction (highways, dams, etc.). However, only one or two selected types of construction are surveyed in any given year. Selected types of construction are resurveyed periodically. These resurveys may, in addition to providing current information on labor requirements, contribute information useful in preparing construction cost indexes and estimates of changes in productivity of on-site construction labor.

Description of Survey

The surveys are designed primarily to determine the number of man-hours represented by a fixed dollar volume ($1,000) of contract construction. Man-hours, as defined by the surveys, include both on-site construction employment and the off-site employment required to produce and deliver materials used in the construction. Data for on-site labor include total man-hours for the supervisory, engineering, clerical, and custodial employees, as well as those for workers in each construction trade at the site of construction. Data for off-site labor include employment in the off-site (e.g., office and warehousing) activities of construction contractors; in building materials and equipment manufacture and distribution; and finally, employment in all the other industries which are affected directly or indirectly by the production and distribution of building materials from raw materials to the final manufactured product. Man-hours are also estimated for the employment created by overhead expenditures of contractors.

Certain types of employment are not covered by the survey. For example, no estimate is made of the employment used in the planning and designing of the projects studied. Also excluded are estimates of employment required in government and public utility agencies which might be affected by the construction being studied. Employment created by the respending of wages and profits of the workers and their employers—the multiplier effect—are not considered within the scope of the studies.

Data Sources and Collection Methods

The surveys cover construction which is nonfederally assisted and/or that which may be totally or partially financed through Federal

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funds. Although the type of construction labor and material requirements data sought are similar for both federally and nonfederally aided projects, the sources for the data are different, particularly for the on-site man-hour information.

For the construction of nonfederally aided projects—those financed entirely by various levels of local government, private individuals or voluntary groups—on-site man-hour data, by occupation, are obtained by field representatives from local authorities, architects, contractors, and other direct participants in the projects. These individuals provide the desired man-hour information from payroll records, daily work force reports, or summary time reports.

For those projects financed wholly or in part by Federal funds, on-site employment information generally is obtained from contractors' payrolls submitted to the government under regulations of the Davis-Bacon Act or other Federal legislation covering federally aided construction.

These payrolls furnish the data for estimating on-site man-hour requirements, as well as data on wages for all hourly rated workers on the projects. Data for on-site salaried employees, not accounted for on the payrolls, are obtained by the field agents from the contractors.

Access to these payrolls also makes possible the collection and presentation of additional detail for the projects studied. This includes information on wage relationships, timing of construction operations, and requirements by type of contractor.

Information on material and equipment costs for the projects studied—i.e., the items which are used for estimating off-site employment—is collected by the field representatives from the individual contractors and subcontractors engaged in the construction of the sample projects.

Sampling and Estimating Procedures

Sampling procedures vary with the type of construction being studied. The "universe" of projects for a specified study generally represents all of the projects known to have been completed during a selected 1-year period.

The projects are then stratified into cells having similar characateristics which may affect man-hour requirements. Factors considered important in cell stratification include (a) regional location, (b) metropolitan or nonmetropolitan locality, (c) types of structure (when known), (d) purpose of structure (if variable)[1] and (e) amount of total construction contract (i.e., size of project).

One or more projects are selected at random from each cell and assigned weights to give total representation of the cell. Substitutions, when necessary, are made from the same cells.

Data from the sample projects are combined in aggregate form to represent the total dollar volume of each cell.

As indicated previously, the off-site employment estimates are derived from the materials and equipment cost information obtained from the contractors and subcontractors cooperating in the studies. The contractors provide a list of the value of each type of material used in the construction of sample projects. These material listings are classified into categories consistent with a 4-digit Standard Industrial Classification code as used in *Census of Manufactures* product groups. For each of these product groups, average amounts of material (in dollars) required for each $1,000 of contract construction cost are determined. The value of materials is reduced by a ratio representing the difference between valuation by the purchaser and valuation by the producer. (This ratio is based on valuation data provided by the U.S. Department of Commerce, Office of Business Economics.) This latter step is required because all data reported by contractors are in purchasers' value, and reduction to producers' value is necessary to obtain figures consistent with Census data which are used to calculate manufacturing employment.

Primary employment in manufacturing is considered to be that required to produce the construction bill of materials in their final stage of fabrication. In this stage, man-hours are developed by multiplying average producers' value of each construction material by the ratio of manufacturing man-hours per $1,000 of production. (This ratio is established by using the *Census of Manufactures.*)

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[1] For example, elementary or secondary schools.

Primary man-hours in the trade, transportation, and service industries are estimated from the difference between producers' and purchasers' value for each construction material. The value differences are alloted to trade and transportation, and primary man-hours for each component of transportation and trade are then estimated from labor factors provided by BLS.

Secondary employment is defined as the employment in all industries involved in production and transportation of building materials and equipment from basic extraction to, but not including, the final manufacturing stage. The Interagency Input-output Study is used to obtain these estimates.[2] For each group of materials, the interindustry study provides information on the amount of secondary products required from each of its 78 industry sectors. The product data are converted to man-hours by use of output per man-hour ratios for each of the sectors. Adjustments for price and productivity are made to provide estimates consistent with the year of construction and bill of materials.

For each off-site stage (primary and secondary), a man-hour figure per $1,000 for the construction being studied is obtained. When these man-hours, plus the builders' off-site employment, are combined with the direct or on-site man-hours, the total employment effect, within the definition used by the studies, is determined.

An exact study of the off-site employment of each construction contractor is not attempted, since it is almost impossible to relate accurately such employment to the projects studied. Builders' off-site employment is occupied not only with the sample projects studied, but also with other current or future projects. The estimate of contractors' off-site man-hours for each $1,000 of construction contract is based on the difference between construction worker employment and total employment in the construction industry, with adjustments for on-site supervisory and administrative employment.

Analysis and Presentation

The construction labor and materials requirements studies are published in Bureau bulletins. Summary articles, based on the survey findings, appear in the *Monthly Labor Review*. The bulletins and articles highlight the total man-hours generated per dollar volume of construction expenditures, with subtotals for on-site and off-site man-hours. In presenting the labor and materials data, the statistical tabulations are supplemented with an analysis of the various factors which apparently affected the man-hour requirements for the specific types of construction studied. The bulletins contain information on the characteristics of the sample projects and the man-hours per square foot and per $1,000 of contract cost, with an analysis of the variations in requirements and costs arising from differences in design, type of structure, and regional or metropolitan versus nonmetropolitan influences.

The reports include information and analysis of: on-site man-hour requirements by occupation; the employment share of the general and special trades contractors engaged in the construction work; direct on-site wage cost; the distribution of employment by periods of construction time; and the cost of major materials.

When feasible, comparisons of unit man-hour and material requirements for earlier periods are made and analyzed.

Uses and Limitations

The results of the labor requirements surveys are used by other offices of the Bureau, other Bureaus of the Department of Labor, other governmental agencies, congressional committees, and industry research and trade organizations, to assist in gauging the impact of planned expenditures for construction on employment, and the economy, generally. Of special interest to market research analysts and companies manufacturing materials for use in construction, are the materials listings per $1,000 of construction contract.

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[2] See "Input-output Structure of the U.S. Economy: 1963," Survey of Current Business, November 1969, pp. 16–47.

While the overall estimates of employment are believed to be reasonably accurate, the detailed data would have a wider margin of sampling error and may be subject to other limitations. Man-hour and material requirements are affected by a number of factors such as location, size of project, type of structure, architectural design, availability of certain materials or equipment, labor skills, and local building codes and customs. The effects of these separate factors cannot be isolated.

Technical References

Labor and Material Requirements Studies

Number

1. *Civil Works Construction by the Corps of Engineers* (BLS Bulletin 1390, 1964).
   A study of on-site and off-site man-hour and wage requirements for dredging and land-type projects in the U.S. Corps of Engineers' civil works program from 1959 to 1960.
2. *College Housing Construction* (BLS Bulletin 1441, May 1965).
   A report based on findings in a survey of 43 college housing projects which were administered by the Community Facilities Administration. The survey is designed primarily to determine the man-hours required for $1,000 of college housing construction.
3. *Construction of Federally Aided Highways*, 1958, 1961, and 1964 (BLS Bulletin No. 299).
   This study provides measures for 1958, 1961, and 1964 of the labor and material requirements for federally aided highways, and separate measures of the requirements for on-site and off-site construction. For on-site construction, the study also provides a comparison of annual man-hour requirements for 1947–64.
4. *Federal Office Building Construction* (BLS Bulletin 1331, 1962).
   A statistical study of on-site and off-site labor requirements for constructing 22 Federal office building projects in various localities of the United States over a 3-year period from the fall of 1957 to 1960.
5. *Hospital Construction* (BLS Bulletin 1340, 1962).
   A statistical study of on-site and off-site labor requirements for construction of selected public and private, profit and non-profit, general hospitals in various localities of the United States between mid-1958 and mid-1959.
6. *Hospital and Nursing Home Construction* (BLS Bulletin 1691, 1971).
   A study similar to the 1962 study but with data shown per square foot as well as per $1,000 of construction contract.
7. *Private One-Family Housing Construction* (BLS Bulletin 1404, 1964).
   A statistical study of on-site and off-site labor requirements for constructing a sample of one-family houses built in 1962 in various localities of the United States.
8. *Public Housing Construction* (BLS Bulletin 1402, May 1964).
   A report based on findings of a survey of 31 public housing projects which were administered by the Public Housing Administration. Projects were selected in various States to be representative of four broad geographical regions of the conterminous United States.
9. *School Construction* (BLS Bulletin 1299, 1961).
   A study of primary and secondary man-hours required per $1,000 of new school construction based on contracts awarded throughout the United States for 85 elementary and 43 junior and senior high schools.
10. *School Construction* (BLS Bulletin 1586, 1968).
    A survey of selected elementary and secondary public schools constructed primarily during the period of 1964–65. In addition to providing information on man-hours, the study also includes data on the types and value of materials used, wages paid, occupations distributed and use of apprentices.
11. *Sewer Works Construction* (BLS Bulletin 1490, 1966).
    This study was designed to measure the total man-hours of labor required for each $1,000 of new sewer facilities construction contract. The basis for this study was 138 contracts for new sewer works in the years 1962–63.

—MARTIN ZIEGLER

Occupational Safety and Health

Chapter 29. Occupational Safety and Health Statistics

Background

Passage of the Occupational Safety and Health Act of 1970 (Public Law 91–596) marked a major departure in the collection of work-injury statistics. The act is comprehensive; it provides that every place of employment subject to the act shall be free from recognized hazards which are likely to cause death or serious physical harm. To assist in attaining this goal, the act provides for recordkeeping and reporting procedures which will identify the seriousness of on-the-job accident and job related illnesses.

The Bureau of Labor Statistics has been assigned responsibility for developing and implementing the statistical program which is required to achieve the objectives of the act.

The Bureau has been concerned for many years with standardizing the methods for compiling work-injury statistics. As early as 1911 the Bureau called a formal conference to discuss the matter. The work of the conference was continued by the International Association of Industrial Accident Boards and Commissions, resulting in publication of the first standardized procedures in 1920.[1] In 1937 the first work-injury standard was published by the American Standards Association, now the American National Standards Institute. The most recent revision is the *Standard Method of Recording and Measuring Work Injury Experience* (Z16.1), 1967.

In December 1969, while Congress was considering comprehensive safety and health legislation, Secretary of Labor J. D. Hodgson (then Under Secretary of Labor) noted in a letter to the American National Standards Institute that the proposed legislation included a national system for the collection of safety and health statistics. He requested that the Institute evaluate whether the standard method contained in Z16.1–1967 was appropriate for the broad universe of employers who would be subject to the proposed legislation. An informal conference called by the Institute concluded that there was cause to believe that the Z16.1 standard was inappropriate for the proposed use and recommended that a study group be formed to consider the matter further and, if necessary, develop a simple method of reporting injuries. This recommendation was based upon a belief that the Z16.1 standard: (1) had grown too complex, through efforts to make it equitable, to form a basis for a mandatory national reporting system, (2) did not adequately reflect trends in injury experience for employers with good safety records, (3) was not adequate for recording health experience.

A study group, formed by the Institute, concluded that a new simple method for recording and reporting occupational injuries and illnesses was needed. The study group's proposal was published by the Institute in December 1970.[2] The recordkeeping regulations which have been issued by the Secretary draw heavily on the proposals of the study group.

Records Required to be Kept

The Occupational Safety and Health Act of 1970 directs the Secretary of Labor to issue regulations which require all employers subject to the act to maintain accurate records of work related deaths, injuries, and illnesses. However, records do not have to be maintained for minor injuries requiring only first aid treatment and which do not involve medical treatment, loss of consciousness, restriction of work or motion, or transfer to another job.

The regulations concerned with recording of occupational injuries and illnesses (29 CFR Part 1904) became effective on July 1, 1971. They require employers to maintain in each establishment a log of occupational injuries and illness. Within 6 working days of receiving information that a recordable case has occurred, the employer must enter the facts called for in the log. At the end of each year the employer is required to complete an annual summary of occupational injuries and illnesses. Information for the summary is drawn from the log. The summary is to be prepared no later than one month after the close of the year and is to be posted prominently in each establishment in a place accessible to the employees.

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[1] *Standardization of Industrial Accident Statistics* (BLS Bulletin 276, 1920).

[2] *Proposed National System for Uniform Recording and Reporting of Occupational Injuries and Illnesses*, American National Standards Institute, New York, New York, 1970.

The log and summary must be kept available in the establishment for a period of 5 years following the end of the year to which they refer. In addition, a supplementary record must be maintained for recordable injury or illness. A form is provided for that purpose (OSHA Form 101) but in most cases a workmen's compensation, insurance, or internal form which must be completed for other purposes will be an acceptable record in place of form 101.

All logs, summaries, and supplementary records must be available in the establishment for inspection and copying by compliance officers or statistical agents of the Federal or State Governments.

Collection Methods

Collection methods are still being formulated. Tentative plans call for an initial collection early in 1972 for the last half of 1971. After that initial period, collection will be on a calendar year basis. Collection will be primarily by mail questionnaire. The respondent will merely transcribe the injury and illness data from the summary form to the questionnaire. The questionnaire will also seek information about the numbers of employee-hours worked and a statement of the product of the establishment.

Coverage

Data will be collected from a representative sample of establishments. The sample for the first report period (July through December 1971) is designed to produce injury data at most of the 2-digit SIC industry levels. The sample for the first full calendar year (1972) of operation under the act will be approximately 200,000 establishments, providing data at the 4-digit SIC industry level in manufacturing and at the 3-digit level in nonmanufacturing.

State Participation

The act encourages the States to assume responsibility for the administration and enforcement of occupational safety and health laws, and for carrying out an occupational safety and health educational program.

The Secretary of Labor is authorized to make grants to the States to assist them in developing and maintaining an effective program of collection, compilation, and analysis of work-injury and illness statistics. A considerable number of States are expected to participate in these grant programs.

Existing Work-Injury Data

Work-injury data have been collected by the Bureau for many years. These data, which have been collected through 1970, will not be comparable to data compiled under the Occupational Safety and Health Act. Methods used in the collection of these data are described in the previous edition of this Handbook. (See Chapter 26 of the *Handbook of Methods for Surveys and Studies,* U.S. Department of Labor, Bureau of Labor Statistics, Bulletin 1458, 1966).

Description of Surveys and Methods

Programs for the collection, tabulation, analysis, and publication of occupational safety and health statistics are being formulated. Details of these programs will be published as supplements to the *BLS Handbook of Methods* probably about mid-year 1973. These supplements can be obtained after mid-1973 from the Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C., 20212, or from any of its regional offices listed on the inside back cover of the *Handbook.*

—Lyle R. Schauer

Due to budget cuts and personnel ceilings, *Labor Developments Abroad,* basic country studies, labor digests, and country or area bibliographies will be discontinued by June 30, 1972.

Economic Trends and Labor Conditions

Chapter 30. Foreign Labor Conditions, International Comparisons, and Trade Research

Background

Almost from its inception, the Bureau of Labor Statistics (BLS) conducted research on labor conditions and developments abroad. The Bureau carries on two research activities of particular interest to users of research reports: analysis of research data on labor in foreign countries and the preparation of international comparisons.[1] The Bureau undertook these research programs because (1) summary and detailed information on labor conditions published by a majority of foreign countries is not available in English (or in any form readily usable by U.S. employers, labor unions, Government officials, and others); (2) users cannot keep pace with the variety of source materials from nearly 200 independent countries and dependencies; and (3) often, none but an expert can judge the quality of source materials.

Description of Reports

The foreign labor research reports published by the Bureau are in part general and in part statistical. The principal types may be listed as follows:

1. *Labor Developments Abroad,* a monthly publication which covers important developments in labor in foreign countries and provides data on living costs abroad, furnished by the Allowances Program of the U.S. Department of State.

2. Basic country studies, primarily monographs on labor law and practice in selected countries. These reports are factual, but not primarily statistical.

3. Brief labor digests on single countries, published either separately or with directories of labor organizations in major geographic areas.

4. Bibliographies, chiefly for a country or an area, often with annotations or brief summaries.

5. International comparisons presented in feature articles and bulletins. These are mainly statistical in nature and contain explanations of the source data and, where possible, adjustments for differences in definitions and methods. So far, principal comparisons published have concerned hourly compensation, output per man-hour, unit labor costs, unemployment, and price trends.

6. Reports on trade and labor developments in selected industries, including the relationship of imports to domestic employment.

The Bureau also provides data in response to individual inquiries from Government officials, U.S. businessmen, labor unions, and students.

Data Sources and Collection Methods

The Bureau receives much material—descriptive, statistical, and analytical—on labor developments abroad, which it maintains in files classified by country and by subject. The material includes (1) current reports from labor attaches and other officers of the U.S. Foreign Service throughout the world; and (2) foreign data from various sources. The latter include periodicals and other publications issued by agencies of foreign countries (labor ministries, bureaus of statistics, and others); international organizations—governmental, business, and labor—as well as the International Labour Organization; and private agencies like banks and economic research organizations in the United States and abroad. When specific supplementary information is needed, the Bureau often requests it through Foreign Service reporting channels.

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[1] Other major BLS activities in the international field include providing orientation and factual advice to U.S. policy and program officers on labor in foreign countries, and providing training or orientation to foreign statisticians and other foreign visitors, especially participants in exchange programs and technical cooperation programs, on U.S. labor statistics methods and on the economic conditions of U.S. workers.

Staff members keep informed by contact with research institutions, with individual scholars specializing in international labor, and with U.S. firms employing labor abroad. In addition, they are briefed by labor attachés and other Foreign Service officers when they visit Washington. Also, from time to time, members of the research staff study foreign labor conditions at first hand by travel abroad.

Analysis and Uses

With the exception of international comparisons, the major focus in the presentation of reports is geographic, although an occasional summary by topic is used. Within an individual country study, the organization is by subject. For the labor law and practice series, subjects include: (1) social, economic, and political background; (2) manpower (including labor force, employment, unemployment, manpower planning and utilization); (3) labor law and administration; (4) wages, supplementary benefits, hours and working conditions; and (5) labor organizations, management organizations, and labor-management relations; (6) industrial safety and workmen's compensation; and (7) social insurance.

Most reports are concerned either with the basic situation at the time the report was written or with a recent development or trend. With a few exceptions, of which real wages is one, less attention is given to historical development of long-term trends. The extent of material covered is so great that often only the most summary information for a given country can be written more often than every 10 years; many countries have never been covered in individual monographs. Reports often contain an annotated bibliography for readers interested in more detail.

International comparison studies were begun in 1960 on a regular basis. They deal with individual subjects and are primarily statistical requiring specific information about details of definition, and information is seldom covered fully by regularly published sources. Therefore, great reliance is placed by the Bureau on requests to the Foreign Service and statistical agencies abroad for information specifically required.

Among subjects covered are international comparisons of labor costs and productivity. For instance, articles containing basic information on "The Role of Labor Cost in Foreign Trade" and on "International Comparisons of Unit Labor Cost: Concepts and Methods" have been published. Absolute comparisons have been issued also for the iron and steel industry in four countries, as well as trend data in index form for all manufacturing in ten principal trading nations and in the United States. Relative labor cost trends are useful for analysis of trade competitiveness, the balance of payments, and inflationary developments. Other topics studied have included unemployment, work stoppages, job vacancies, and price trends.

The greatest problem involved in comparing unit labor costs among countries arises from the fact that labor cost data are available by industry, but output is reported by product. Since nearly all industries produce a number of products, the question of labor cost allocation to specific products (or product synthesis) arises.

The trend data published for all manufacturing are taken, in most cases, from official statistical reports issued by the individual countries. Because the data are not entirely comparable from country to country, and because more than one set of data exists for most free industrial countries, considerable effort is spent in analyzing the individual series and selecting those most consistent and valid. In most countries where it was available, the Bureau decided (1) to use as the measure of labor cost the compensation of employees in manufacturing, from the national accounts, and (2) to use as the measure of total output the real gross in approach. The methods are often intricate, national product originating in manufacturing. The chief reason for this decision has been the greater comparability and comprehensiveness of these measures.

As regards unemployment, the interest in international comparison centers on the percentage of the labor force unemployed. Data published by the individual countries on a current basis are of different types. However, most industrial countries of the free world have made one or more sample surveys of their labor forces, using definitions and methods fairly comparable to those in the United States. The Bureau uses these latter data (adjusted as carefully as feasible to uniform definitions and brought up to date by the best data currently available) as the basis for international comparisons of unemployment rates.

A program is under development for conducting studies of the relationship of foreign trade to U.S. labor. Analyses will be prepared for selected industries in order to understand the factors contributing to employment changes and the effects of rising imports on employment. Since the relationship of trade to employment is usually indirect and difficult to measure, a multiple approach will be taken, including review of plant closings, mass layoffs of employees, and the effects of changes in demand, imports, and productivity on employment.

—JULIET F. KIDNEY AND JOHN CHANDLER

Chapter 31. Economic Growth Studies

Background

The Bureau of Labor Statistics has developed a program of economic growth studies aimed at providing a more comprehensive and integrated framework for analyzing the problems of long-run economic growth in relation to employment opportunities. Because this program has important implications for many agencies of the Government, an interagency planning and coordinating committee provides the guidelines for the program. The chairman of the committee is from the Council of Economic Advisers; other members come from the Bureau of Labor Statistics, U.S. Department of Labor; Office of Business Economics, U.S. Department of Commerce; and the Office of Management and Budget.

A primary objective of the program is to develop projections, under alternative assumptions, of the rate and pattern of economic growth in the United States. These provide a framework for assessing a number of important economic problems, including problems of manpower utilization over the next decade.

Methods

An economic growth model has been developed to serve as a tool in making economic projections. This model begins by developing a potential economic growth rate for the United States. To do this, it must project the labor force to the target year, assuming a specified unemployment rate, and project the rates of change in productivity and average hours paid. This potential growth in gross national product (GNP) is distributed among the four major components (or demand categories) of GNP: consumer expenditures; domestic investment; government expenditures—Federal, State, and local; and net foreign demand.

The next stage is to develop a projection of the industry composition of demand for each of the four major demand categories. For example, the consumer expenditures category includes the amounts spent on rents, automobiles, medical expenses, and other goods and services purchased by consumers. For each of the four major demand categories, a different procedure is followed in allocating demand to the producing industry. The industry detail to which the categories of demand are allocated matches the input-output classification.

Demand as used in the national income accounts refers only to final demand, i.e., that of the ultimate consumer. To place a value on the output of an industry whose products are not sold to ultimate consumers, but are used instead by other industries in the course of their own production, an addition set of calculations is necessary using input-output. The input-output system translates final demand for a given product into the output that is required from all other industries to produce the materials needed to manufacture that product or service.

The third stage is to project the input-output coefficients. The input-output tables used as a base in the economic growth model are published by the Office of Business Economics, U.S. Department of Commerce. However, these input-output tables incorporate the technology and product mix for a base year, and may not reflect adequately the technology and product mix which may prevail during the period for which the projection is being made. To account for this difference, two methods are used: Detailed analyses are made of the changes taking place in the technology of various industries as well as the changes expected in product mix due to differing growth rates of product groups within industries. For industries for which detailed studies are not made, analyses are developed to determine the direction and magnitude of change in the use of its products by other industries.

Next, employment estimates by industry are developed. This is accomplished by use of a set of industry productivity projections. The final stage is to balance the model. Projections contain many complex relationships among economic variables that were developed through a lengthy sequence of operations. It is necessary to have a set of checks and balances to insure that the various states of the projections make up an internally consistent model. The economic growth model is designed to provide a feed-back and balancing procedure with respect to three of its elements: imports, investment, and employment. In practice, all three of these elements must be brought into balance simultaneously.

Uses

.The projections developed in the economic growth program serve a number of uses. The employment projections by industry are used in developing occupational outlook projections. The projections developed by the Bureau form an important part of the U.S. Government's report to OECD on long-term economic outlook for the United States. In addition, other Government agencies use various facets of the economic growth projection to develop projections in their specific areas of responsibility. Outside of government, the projections of GNP and industry growth patterns are important sources of information for industry analysts. Their use of these projections are primarily in diversification studies, market analysis, and long-term capital planning.

The structure of the economic growth model is developed so that other analytical use is made of the program. Specifically, the program is used to analyze the industry by industry effect of changing levels and patterns of various types of demand such as defense expenditures. Similar types of analysis also is performed for exports and imports to provide information on the employment requirements for foreign trade.

Technical References

Number

1. U.S. Department of Labor, Bureau of Labor Statistics, *Patterns of U.S. Economic Growth: 1980 Projections of Final Demand, Inter-industry Relationships, Output, Productivity, and Employment* (Bulletin 1672, 1970).
2. ——— *Projections 1970: Interindustry Relationships, Potential Demand, Employment* (Bulletin 1536, 1966).
3. Oliver, Richard P., "Increase in Defense-Related Employment During Vietnam Buildup," *Monthly Labor Review*, February 1970, pp. 3-10.
4. Bowman, Charles T., "Report on Employment Related to Exports," *Monthly Labor Review*, June 1969, pp. 16-20.

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Appendix A. The BLS Seasonal Factor Method

Background

An economic time series may be affected by regular intra-yearly ("seasonal") movements which result from climatic conditions, model changeovers, vacation practices, holidays, and similar factors. Often such effects are large enough to mask the short-term underlying movements of the series. By isolating and removing the effect of such intra-yearly repetitive movements, the current evaluation of a series may be made more perceptive.

Seasonal movements are found in almost all economic time series. They may be regular, yet they do show variation from year to year and are also subject to changes in pattern over time. Because these intra-yearly patterns are combined with the underlying growth or decline and cyclical movements of the series ("trend-cycle") and also random irregularities, it is difficult to determine the pattern with exactness.

More than a half-century ago, attempts were made to isolate seasonal factors from time series. Some early methods depended upon smoothing curves by using personal judgment. Other formal approaches were periodogram analysis, regression analysis, and correlation analysis. Because these methods involved a large amount of work, relatively little application of seasonal factor adjustment procedures was carried out.

In the mid-1950's, new electronic equipment made more elaborate approaches feasible in seasonal factor methods as well as in other areas. Using a computer, the Bureau of the Census developed seasonal factors based on a ratio-to-moving-average approach. This was a major forward step, as it made possible the uniform application of a method to a large number of series at a relatively low cost.[1] Subsequent improvements in methods and in computer technology have led to more refined procedures which are both faster and cheaper than the original technique.

The Bureau of Labor Statistics began its work in seasonal factor methods in 1959, primarily to correct a deficiency in the method then used. Prior to this time, when additional data became available and seasonal factors were generated from the lengthened series, the new factors sometimes differed markedly from the corresponding factors based on the shorter series. This difference could affect any portion of the series. It was difficult to accept a process by which the addition of recent information could affect significantly the seasonal factors for periods as much as 15 years earlier, especially since this meant that factors could never become final. The first method developed by BLS and introduced in 1960 had two goals: first, to stabilize the seasonal factors for the earlier part of the series; second, to minimize the revisions in the factors for the recent period.

Since 1960, the Bureau, through continued research, has made numerous changes and improvements in its techniques and in methods of applying them. These changes were described[2] as they were introduced. The method introduced in May 1966 is described in the sections which follow.

Characteristics of BLS Seasonal Factor Method

The BLS method is a ratio-to-moving-average method. It assumes that the three component parts—trend-cycle, seasonal, and irregular—are multiplied together (multiplicative assumption) to give the original observations.[3] (See illustration in charts 1 and 2.) The BLS method differs from other similar methods in the following respects:

1. The initial trend cycle is improved by restoring to it any residual trend-cycle which may have found its way into the irregular component. This adjustment for the deficiency in trend-cycle is developed explicitly and is avail-

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[1] Julius Shiskin, *Electronic Computers and Business Indicators*. New York, National Bureau of Economic Research, (1957). Occasional Paper No. 57.

[2] See U.S. Department of Labor items in the list of Technical References at the end of this appendix.

[3] A parallel method assuming an additive relationship among the components also has been prepared for experimental use.

able for review in the form of a table of trend-cycle correction values.

2. The BLS method provides for changes over time in the producing mechanism (changes in samples, method of collection, method of estimation) or in economic factors (introduction of guaranteed annual wage plans, etc.).[4]

3. The BLS method calibrates each observation in order to assign a supplementary weight which is used in the various averaging processes. These "credence factors" reduce the effect of observations having large irregularities. They increase the smoothness with which the seasonal factors change over time, and they also keep large irregularities out of the final trend-cycle.

4. A second way in which the BLS method attempts to protect the final trend-cycle from large irregular fluctuations is by using modified original values for computing the centered 12-month moving average in the later stages of the procedure. The credence factors are used in obtaining the modified original values.

The BLS method is very complex and requires an enormous amount of arithmetical computations. Therefore, the method has been adopted for use on electronic computers. At present, two program decks are available: one written in FORTRAN II and another in FORTRAN IV. Special emphasis has been placed on keeping the handling and clerical requirements to an absolute minimum, on providing as many aids as possible for analysts or others using the results, and on making the application of the computer program as simple and efficient as possible. Only the data and one specification card are needed to produce a set of completely labelled tables for each series. Any number of series with varying characteristics (length of series, starting and ending dates, magnitude of original observations, final table patterns desired) can be processed in a single running without manual intervention. The computer program for applying the BLS procedure is available on request.[5]

Basic Approach

The BLS method attempts to separate an economic time series into three constituent parts: the underlying movement or trend-cycle which is a combination of the long-term, cyclical, and subcyclical movements (T); the annual repetitive movement within the year, or "seasonal"[6] (S); the irregular or residual unexplained movement (I). These three components, when multiplied together, completely and exactly exhaust the original observations (O). (See charts 1 and 2.) The exact allocation among the components is somewhat arbitrary, because there are no simple criteria or generally accepted techniques for separating them. The BLS method attempts to strike a good balance between the conflicting objectives of smoothness in the trend-cycle, stability in the seasonal, and randomness in the irregular. The process is an iterative one; each successive iteration provides an improved estimate for each of the components of the original series.

Three iterations are used, each having two phases. The first phase of each iteration starts with a centered 12-month moving average as the estimate of trend-cycle. Seasonal-irregulars are then secured and partitioned into seasonal and irregular components. The second phase in each iteration starts with an improved trend-cycle in which the centered 12-month moving average has been improved by recovering the residual trend-cycle from the irregulars of the first phase. The seasonal and irregular components then are developed as in the first phase.

The Bureau's method uses "credence factors" based on the irregulars from the second phase of each iteration to reduce the effect of large

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[4] A 5-year moving period is used to reflect such changes. The use of the 5-year moving period allows the full impact of a change to be reflected in a relatively short period of time. A review of the basic U.S. labor force series, for example, indicates that in the early 1960's the standard deviation of the irregular component is only 0.6 as large as it was in the early 1950's. This reflects the improvements made in the survey, such as the expansion in the number of sample areas, the increase in the number of households covered, the changes in the estimating methods, and the improvements in the design of selecting households so that there would be a three-quarters overlap in adjacent months and a one-half overlap over the year.

[5] Upon request, the Bureau of Labor Statistics will make its seasonal factor computer program available in the following form: (1) A source deck of punched cards containing the program instructions; (2) A deck of punched cards containing a text problem which will enable the user to verify the output; (3) Two copies of a document containing operating and reference material.

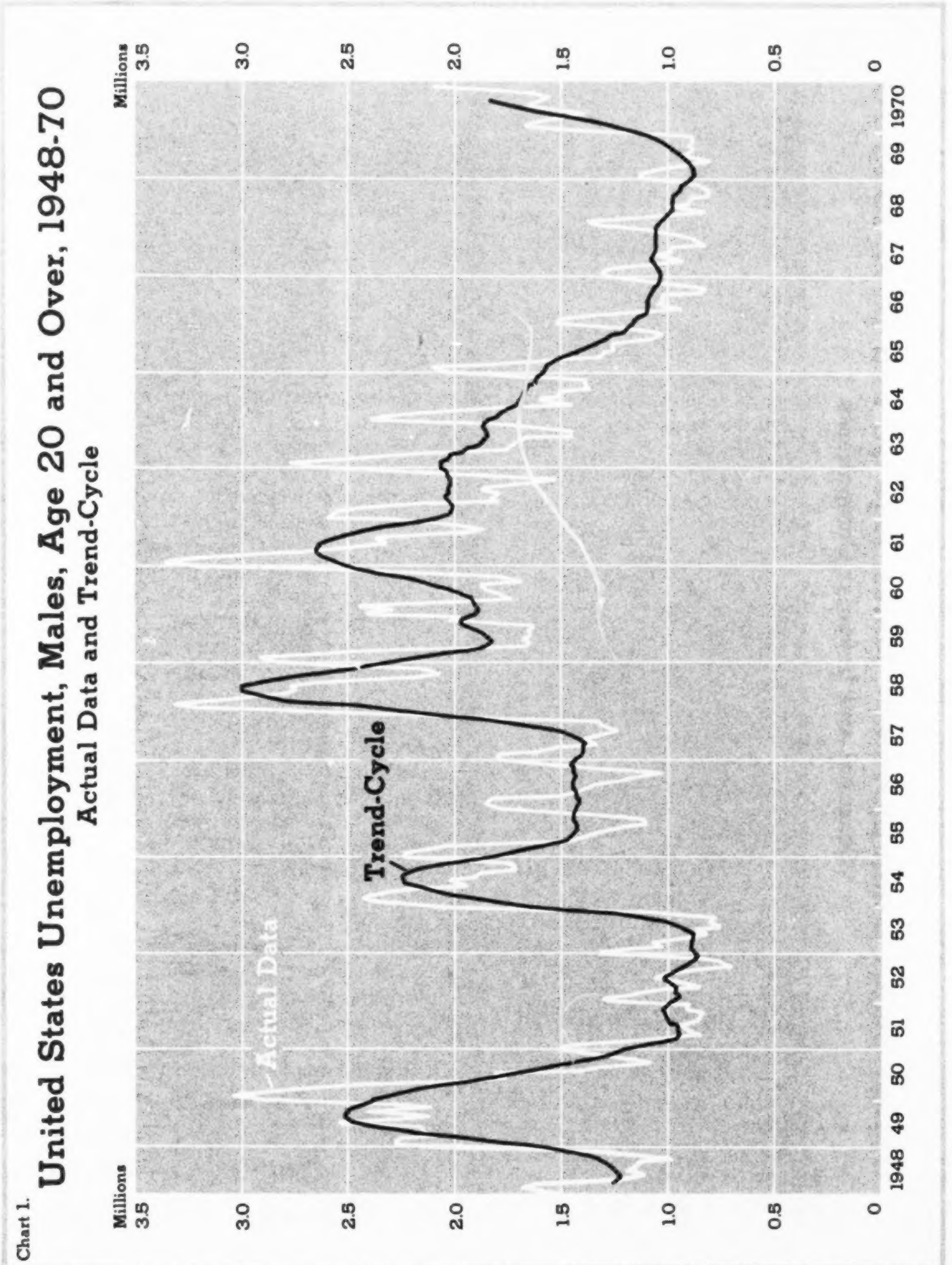


Chart 1.

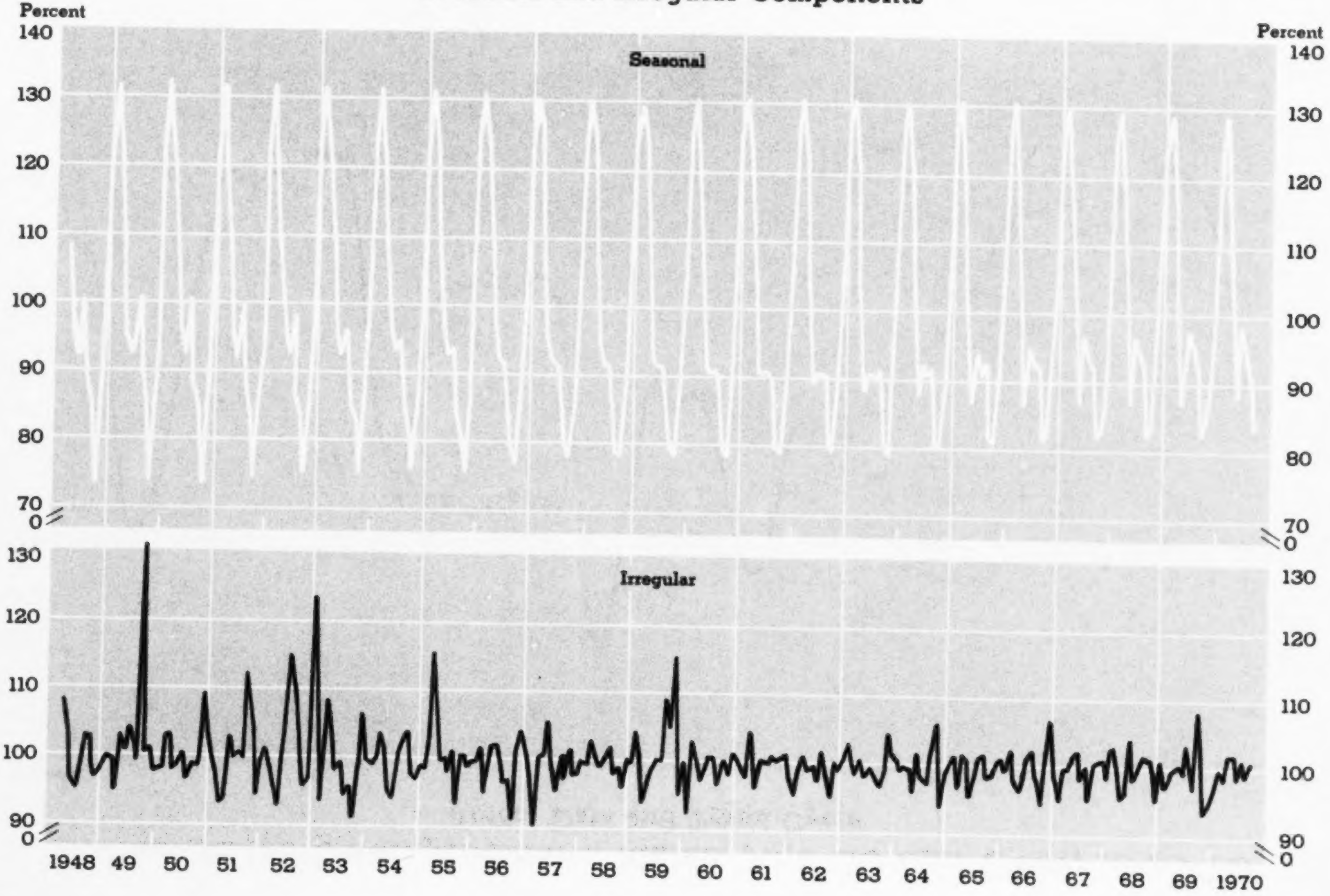
United States Unemployment, Males, Age 20 and Over, 1948-70

Actual Data and Trend-Cycle

Chart 2.

United States Unemployment, Males, Age 20 and Over, 1948-70

Seasonal and Irregular Components



irregularities in the original observations. These are supplementary weights in which observations with small[6] irregulars are given more weight than observations with large irregulars in calculating the trend-cycle and the seasonal factors.

Detailed Procedure of BLS Seasonal Factor Method

First iteration

First Phase. The initial estimate of trend-cycle (T) is the centered 12-month moving average of the original observations. The trend-cycle value for each month is divided into its corresponding original value (O) to produce a series of seasonal-irregular (SI) ratios ($O/T=SI$). Treating each month separately (i.e., all January's, all February's), the SI ratios are arrayed by years and moving 7-term weighted averages[7] (S′) are secured (in percentage form) as estimates of the unforced seasonal factors. The unforced seasonals (S′) for each year are then adjusted to yield a monthly average of 100.0 for the calendar year.[8] These forced seasonal factors (S) are the seasonal factors for the first phase of the first iteration. Each seasonal-irregular ratio (SI) is then divided by its forced seasonal factor (S) to yield the random or irregular ratio ($SI/S=I$). The irregular ratios at this stage may contain some residual trend-cycle.[9] To separate the residual trend-cycle from the truly random variation contained in the irregulars, a 9-term weighted moving average[10] (trend-cycle correction) of the first phase irregulars is secured. This completes the first phase of the first iteration.

Second Phase. The second phase of the first iteration starts with an improved estimate of the trend-cycle. This is secured by multiplying the trend-cycle used in the first phase (the centered 12-month moving average of original observations) by the trend-cycle correction (weighted moving average of first phase irregulars). Using this improved trend-cycle, the second phase repeats the computational steps of the first phase to develop new SI ratios, new unforced seasonals (S′), new forced seasonals (S), and new irregulars (I). At this point, the generated trend-cycle and seasonal components represent the components of the original series fairly well except for the effect of highly

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[6] References to "large" or "small" irregulars have to do with the deviation of the irregular component from 1.000 in relation to the standard deviation of such irregulars. A value of 1.423 or .577 would usually be considered large, while .997 or 1.003 would be small.

[7] The weight patterns used are:

Seasonal	*Weight pattern assigned to seven consecutive seasonal-irregular ratios*						
1st year	.281	.270	.242	.207	---	---	---
2nd year	.213	.221	.213	.191	.162	---	---
3rd year	.160	.179	.185	.179	.160	.137	---
Middle years	.120	.141	.157	.164	.157	.141	.120
3rd from end	---	.137	.160	.179	.185	.179	.160
2nd from end	--	---	.162	.191	.213	.221	.213
End year	---	---	---	.207	.242	.270	.281

The underlined value indicates the year to which the weighted average applies.

[8] The forcing is performed in two stages: If the unforced seasonals do not start in January, the first 12 unforced seasonals are summed and the total divided into 1200 to provide a forcing factor. This factor is then multiplied by the unforced seasonals for the partial year only (through the first December value) to provide the forced seasonals for the incomplete at the beginning of the series. A similar procedure is followed at the end of the series if the unforced seasonals do not end in December. For each of the full calendar years between, a forcing factor is computed by dividing the sum of the unforced seasonals for the year into 1200. This factor is then multiplied by the unforced seasonals in that year to produce the forced seasonals.

[9] This is because the 12-month moving average is not very good at following abrupt or curvilinear changes in the level of the original series, particularly in the vicinity of peaks and troughs. Since the trend-cycle, seasonal, and irregular components completely and exactly exhaust the original series, any deficiency of the first estimate of trend-cycle is transferred to the seasonal and/or the irregular. However, the seasonal factors are secured by averaging seven SI ratios, each one year apart. This averages the deficiency for seven different years, with the result that the deficiency of the 12-month moving average, as an estimator of trend-cycle, appears mainly in the irregular component. The periods where the 12-month moving average is a poor estimator of trend-cycle, usually have a run of consecutive irregular ratio all on the same side of the base reference ratio of 1.000 instead of being scattered above and below this base.

[10] The weight patterns used are:

Month	*Weight pattern assigned to nine consecutive irregulars*								
1st month	.370	.341	.256	.115	—.082	---	---	---	---
2nd month	.254	.276	.254	.191	.086	—.061	---	---	---
3rd month	.160	.214	.231	.214	.160	.072	—.051	---	---
4th month	.067	.150	.199	.216	.199	.150	.067	—.048	---
Middle months	—.050	.071	.157	.209	.226	.209	.157	.071	—.050
4th month from end		—.048	.067	.150	.199	.216	.199	.150	.067
3rd month from end		---	—.051	.072	.160	.214	.231	.214	.160
2nd month from end	--	---	---	—.061	.086	.191	.254	.276	.254
End month	--	---	---	--	—.082	.115	.256	.341	.370

The underlined weight indicates the month to which the weighted average applies.

deviant original values. In the BLS method, the influence of such values is diminished by using supplementary weights in addition to the regular weights given in footnotes 7 and 10. The use of these supplementary weights (called "credence factors") gives less impact to the extreme observations (those with large irregular components) and relatively more to the neighboring values with smaller irregular components.[11]

With the preliminary credence factors, the SI ratios of the second phase are repartitioned into seasonals and irregulars. The *adjusted* unforced seasonal is a 7-term moving average of the SI ratios, using as relative weights the product of the standard 7-term weights (given in footnote 7) and the preliminary credence factor associated with each value. These unforced seasonals (S′) are forced in the usual manner to total 1200 for the calendar year, after which adjusted irregulars are calculated by dividing the adjusted forced seasonals (S) into the SI values.

This repartitioning of the SI ratios removes the large irregular variation from the seasonal component and puts it in the irregular component instead. However, the trend-cycle is still contaminated by deviant original values, because it was calculated before the credence factors were developed.

The second iteration is designed to provide an improved 12-month average for use in developing revised components. In preparation for this, the adjusted irregulars of the first iteration are used to develop revised (intermediate) credence factors. These intermediate credence factors are computed from the adjusted irregulars in exactly the same way (described in footnote 11) as the preliminary credence factors are obtained from the earlier second phase irregulars.

The first use of the intermediate credence factors is to create a modified original series having no large irregularities. Each original value having a credence factor less than 1.000 is replaced by a modified value in which the irregularity has been reduced.[12] The creation of the modified original series marks the end of the first iteration.

Second iteration

First Phase. The second iteration is similar to the first iteration, except that the intermediate credence factors are used along with the weight patterns of footnotes 7 and 10. The second iteration, like the first, has two phases. The first phase begins with the centered 12-month moving average of the modified original series previously described. SI ratios are secured by dividing the actual original series (not modified) by this 12-month average. The SI ratios are arrayed by month and moving 7-term averages, using the weights of footnote 7 and the intermediate credence factors, are taken to yield unforced seasonals (S′). (The credence factors prevent extreme observations from affecting the seasonals.) The forcing process is then applied to yield seasons (S) which average 100.0 for the calendar year. Irregulars (I) are secured by dividing the latest SI ratios by their corresponding forced seasonals (S). These irregulars may include some residual trend-cycle because of the failure of the 12-month moving average to fully penetrate the peaks and troughs of the modified original series. A trend-cycle correction is computed by arraying the irregulars in normal time sequence and taking moving 9-term averages, using the weights of footnote 10 and the intermediate credence factors. This completes the first phase of the second iteration.

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[11] The credence factors are computed as follows. First, a test is made to locate extreme irregulars falling outside of the 3 sigma limit. These irregulars are replaced by a value of 1.000 for a new sigma calculation. A moving 61-term standard deviation of the irregulars is computed for calibrating the irregular associated with the middle (31st) term. For the 30 terms at the beginning (end) of the series, the first (last) centered value is used for the calibration. Each irregular is then standardized by getting its absolute difference from the mean of the 61 terms used to secure its standard deviation, and dividing this difference by the standard deviation.

A preliminary "credence factor" is assigned to each value, based on its standardized irregular, as follows: For a standardized irregular of 1.000 or less, the credence factor is 1.000. For a standardized irregullar of 2.800 or more, the credence factor is 0.000. For a standardized irregular between 1.000. For a standardized irregular of 2.800 or more, the standardized irregular. The 2.8 sigma limit makes it extremely unlikely for a "good" value, not affected by a strike or other such aberration, to be assigned zero credence. Only one-half of one percent of the values in the normal distribution lie beyond this limit. On the other hand, "bad" values which deserve to be disregarded have a much higher probability of falling outside the limit.

[12] The amount of reduction for each observation is such that the deviation of its new irregular from 1.000 is the product of the credence factor and the deviation of its old irregular component. Thus, each modified original value is the product of the trend-cycle and seasonal components developed in the first iteration, times an irregular which has been scaled down if it exceeded one standard deviation. The modified original values are used only to secure an improved 12-month moving average with which to start the second iteration; seasonal-irregulars are always calculated from the actual original values.

Second phase. The second phase of the second iteration starts with an improved trend-cycle, which is the product of the centered 12-month moving average of the modified originals and the trend-cycle correction previously described. The second phase repeats the steps and procedures of the first phase to develop new SI ratios, new unforced seasonals (S′) making use of the intermediate credence factors, new forced seasonals (S), and new irregulars (I).

These second phase irregulars are used to calculate final credence factors in the same way as before (see footnote 11). Then a new modified original series is secured in the same manner as before (see footnote 12), using the final credence factors. This completes the second iteration.

Third iteration

The third iteration carries the refinement process still further. It follows the same steps as in the second iteration, from the centered 12-month moving average of the newly modified original series up to the development of the irregular component near the end of the second phase. This completes the partitioning of the series into the final trend-cycle, seasonal, and irregular components.[13] As supplementary information to aid in analysis and evaluation, the final irregular is standardized using 61-term moving sigmas, which are printed also. The seasonally adjusted series is calculated by dividing the original series (O) by the final seasonal factors (S).

Cautionary notes

In applying the method, the user should be aware that the result of combining series which have been adjusted separately will usually be a little different from the direct adjustment of the combined series. For example, the quotient of seasonally adjusted unemployment divided by seasonally adjusted labor force will not be quite the same as when the unemployment rate is adjusted directly. Similarly, the sum of seasonally adjusted unemployment and seasonally adjusted employment will not quite match the directly adjusted labor force. Separate adjustment of components is usually preferable if their seasonal patterns are different, provided the increased measurement errors in the components are not excessive and that the amount of work does not proliferate unduly.

Finally, it is worth noting that the availability of a fast, efficient procedure for making seasonal computations can easily lead to the processing of large numbers of series without allotting enough time to review the results. No standard procedure can take the place of careful review and evaluation by a skilled analyst. A subjective review of all results is strongly recommended. The computer program for applying the BLS method facilitates such review by providing the needed materials in a logical and easily used format.

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[13] Additional iterations yield little further modification. The decision to stop with 3 iterations was based on the very small changes occurring after the third iteration, the reasonable fit of the trend-cycle to the original data, and the cost of additional processing.

Technical References

Number

1. Barton, H. C., Jr., "Adjustment for Seasonal Variation," *Federal Reserve Bulletin*, June 1941, pp. 518–528.
   The classic account of the FRB ratio-to-moving-average method, in which the analyst uses his skilled judgment to draw freehand curves at key stages of the procedure.
2. Macaulay, Frederick R., *The Smoothing of Time Series*. New York, National Bureau of Economic Research (1931). Publication of NBER No. 19.
   An early discussion of moving averages and of the criteria for choosing one average rather than another.
3. Organization for Economic Co-operation and Development, *Seasonal Adjustment on Electronic Computers*, Paris, 1961.
   The report and proceedings of an international conference held in November 1960. Describes experience in the United States, Canada, and several European countries. Includes theoretical sections relating to calendar (trading day) variation and general properites of moving averages.
4. Shiskin, Julius, *Electronic Computers and Business Indicators*, New York, National Bureau of Economic Research (1957). Occasional Paper No. 57. Also published in *Journal of Business*, Vol 30, October 1957, pp. 219–267.
   Describes applications of the first widely used computer program for making seasonal adjustments.
5. U.S. Department of Labor, Bureau of Labor Statistics, *The BLS Method of Deriving Seasonal Factors*. Paper presented at the Interstate Conference on Labor Statistics, Newport, R.I., June 16, 1960.
6. U.S. Department of Labor, *The BLS Seasonal Factor Method;* paper presented at the 1960 Annual Meeting of the American Statistical Association, Palo Alto, Calif., Aug. 23, 1960.
7. U.S. Department of Labor, *New Seasonal Adjustment Factors for Labor Force Components;* Special Labor Force Report No. 8 (1960). Includes article by Morton S. Raff and Robert L. Stein published in the *Monthly Labor Review*, August 1960, pp. 822–827.
8. U.S. Department of Labor, *The Bureau of Labor Statistics Seasonal Factor Method;* Paper presented at the Interstate Conference on Labor Statistics, Atlantic City, N.J., June 21, 1962.
9. U.S. Department of Labor, *The Bureau of Labor Statistics Seasonal Factor Method (1963 Revision);* paper presented at the Interstate Conference on Labor Statistics, San Francisco, Calif., June 27, 1963.
10. U.S. Department of Labor, *The BLS Seasonal Factor Method, Its Application by an Electronic Computer* (1963).
11. U.S. Department of Labor, *The BLS Seasonal Factor Method (1964)*. (1964).
12. U.S. Department of Labor, *The BLS Seasonal Factor Method (1966)*. (1966).

Appendix B. Industrial Classification

Much of the usefulness of BLS statistics presented by industries is due to the fact that they can be compared with other types of data for the same industries. This is possible because BLS and other Federal and State agencies follow as closely as possible a single system to define and classify industries in the U.S. economy. The Government publishes a Standard Industrial Classification Manual (SIC) of industries based on principles set forth by a technical group made up of government and industry experts.[1] The Bureau of Labor Statistics took part in the development of the SIC over a long period of years and continues to work actively with the Office of Management and Budget and other agencies in seeking to improve the system.

Four basic principles were followed in developing the classification:[2]

(1) The Classification should conform to the existing structure of American industry. (2) The reporting units to be classified are establishments, rather than legal entities or companies. (3) Each establishment is to be classified according to its major activity. (4) To be recognized as an industry, each group of establishments must have significance from the standpoint of the number of persons employed, volume of business, and other important economic features, such as the number of establishments.

As there are thousands of products and activities, the system provides for grouping these into categories, both narrow and broad, to enhance the value of industrial statistics for users interested in different levels of detail.[3]

Using the SIC as a guide, the Bureau classifies the reports received from each factory, shop, or store according to major product or activity. The SIC is used in the same way by the agencies supplying the Bureau with its universe lists and benchmark data. Hence, a high degree of orderliness and consistency is attained, which benefits not only the users of all BLS establishment statistics, but also the users of all Government figures.

Certain operational problems make it impracticable, however, to secure complete uniformity by this process. Also, specific modes of applying the SIC differ from one statistical program to another. For example, there may be differences in the way in which "major activity" is determined; or changes in the major activity of individual establishments which occur over time may be handled in statistical time series in different ways. Consequently, the use of the same manual and following a common set of principles of application do not always result in identical industry classifications of a given establishment by all agencies, or even by all programs within BLS. Therefore, any major deviations from the normal method of handling industrial classification will be described in the chapters on BLS establishment statistics, such as those on employment, work injuries, and the like.

The standard definition of establishment is stated as follows:

> An 'establishment' is an economic unit which produces goods or services—for example, a farm, a mine, a factory, a store. In most instances, the establishment is at a single physical location; and it is engaged in only one, or predominantly one, type of economic activity for which an industry code is applicable.
>
> Where a single physical location encompasses two or more distinct and separate economic activities for which

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[1] Office of Management and Budget, *Standard Industrial Classification Manual*, 1967.

[2] Ibid. pp. IX, X.

[3] The SIC provides for different levels of aggregation. The broadest level divides the economy into 10 Divisions: A. Agriculture, forestry, and fisheries; B. Mining; C. Contract construction; D. Manufacturing; E. Transportation, communication, electric, gas, and sanitary services; F. Wholesale and retail trade; G. Finance, insurance, and real estate; H. Services; I. Government; and J. Nonclassifiable establishments. At the 2-digit level all products and services are combined into 99 "major groups." Thus, in the Manufacturing Division, establishments engaged in manufacturing machinery, apparatus, and supplies for the generation, storage, transmission, transformation, and utilization of electrical energy are combined into Major Group 36, "Electrical machinery, equipment, and supplies."

The 3-digit level provides several hundred categories. In the electrical machinery major group the SIC provides 8 groups of industries: 361. Electric transmission and distribution equipment; 362. Electrical industrial apparatus; 363. Household appliances; 364. Electric lighting and wiring equipment; 365. Radio and television receiving sets, except communication types; 366. Communication equipment; 367. Electronic components and accessories; 369. Miscellaneous electrical machinery, equipment, and supplies.

Thousands of products and activities are distinguished at the 4-digit level. For example, in Group 367, five industries are defined: 3671. Radio and television receiving type electron tubes, except cathode ray; 3672. Cathode ray picture tubes; 3673. Transmitting, industrial, and special purpose electron tubes; 3674. Semiconductors and related devices; 3679. Electronic components and accessories, not elsewhere classified.

different industrial classification codes seem applicable, such activities should be treated as separate establishments and classified in separate industries, provided it is determined that: (1) such activities are not ordinarily associated with one another at common physical locations; (2) no one industry description in the Standard Industrial Classification includes such combined activities; (3) the employment in each such economic activity is significant; and (4) reports can be prepared on the number of employees, their wages and salaries, and other establishment type data. An establishment is not necessarily identical with the business concern or firm, which may consist of one or more establishments. Also, it is to be distinguished from organizational subunits, departments, or divisions within an establishment. Supplemental interpretations of the definition of an establishment are included in the industry descriptions of the Standard Industrial Classification.[4]

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[4] Ibid., p. X.

Appendix C. Geographic Classification

United States and States

All statistical series of the Bureau were expanded in 1959 to include Alaska and Hawaii. Due to the relatively small populations of these new States, the effect on national time series was small. Where statistics are published by States, data for these States and other small States are shown where reliable data are available.

Generally speaking, BLS assigns an establishment to the State in which its employees are reported for payroll tax purposes, since these sources are used both for deriving benchmark levels and for drawing samples.

Standard Metropolitan Statistical Areas

Some of the Bureau's data are presented not only on a national and State basis, but also for selected metropolitan areas. Comparability of area statistics among Federal agencies is maintained by means of a set of published standard definitions.[1] Defining metropolitan areas for statistical purposes is done on the basis of information about population and about economic and social ties among cities. To qualify as a Standard Metropolitan Statistical Area under current rules, an area must have at least one city with 50,000 or more inhabitants, or two contiguous cities meeting certain other criteria.[2] Which counties are to be included in the standard area is determined on the basis of criteria relating to metropolitan character and extent of economic and social communication among counties.[3]

The Bureau of Labor Statistics is represented on the Federal Committee on Standard Metropolitan Statistical Areas, and plays an active role in the Technical Committee on Area Definitions. Both interagency groups are under the chairmanship of the Office of Management and Budget.

State Economic Areas

State economic areas are relatively homogeneous subdivisions of States developed by the U.S. Department of Commerce's Bureau of the Census, in cooperation with the U.S. Department of Agriculture's Bureau of Agricultural Economics, and several State and private agencies. They consist of single counties or groups of counties which have similar economic and social characteristics. The boundaries of these areas have been drawn in such a way that each State is subdivided into relatively few parts, with each part having certain significant characteristics which distinguish it from adjoining areas.[4]

—Robert B. Steffes

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[1] U.S. Office of Management and Budget, *Standard Metropolitan Statistical Areas*, 1967.

[2] The population criteria are:

1. Each standard metropolitan statistical area must include at least:

(a) One city with 50,000 or more inhabitants, or

(b) Two cities having contiguous boundaries and constituting, for general economic and social purposes, a single community with a combined population of at least 50,000, the smaller of which must have a population of at least 15,000.

2. If two or more adjacent counties each have a city of 50,000 inhabitants or more (or twin cities under 1 (b)) and the cities are within 20 miles of each other (city limits to city limits), they will be included in the same area unless there is definite evidence that the two cities are not economically and socially integrated.

[3] Ibid., pp. 1–2.

[4] U.S. Bureau of the Census, *Census of Population 1960*. Report PC(1) 1A. Number of Inhabitants. U.S. Summary, p. XXVII.

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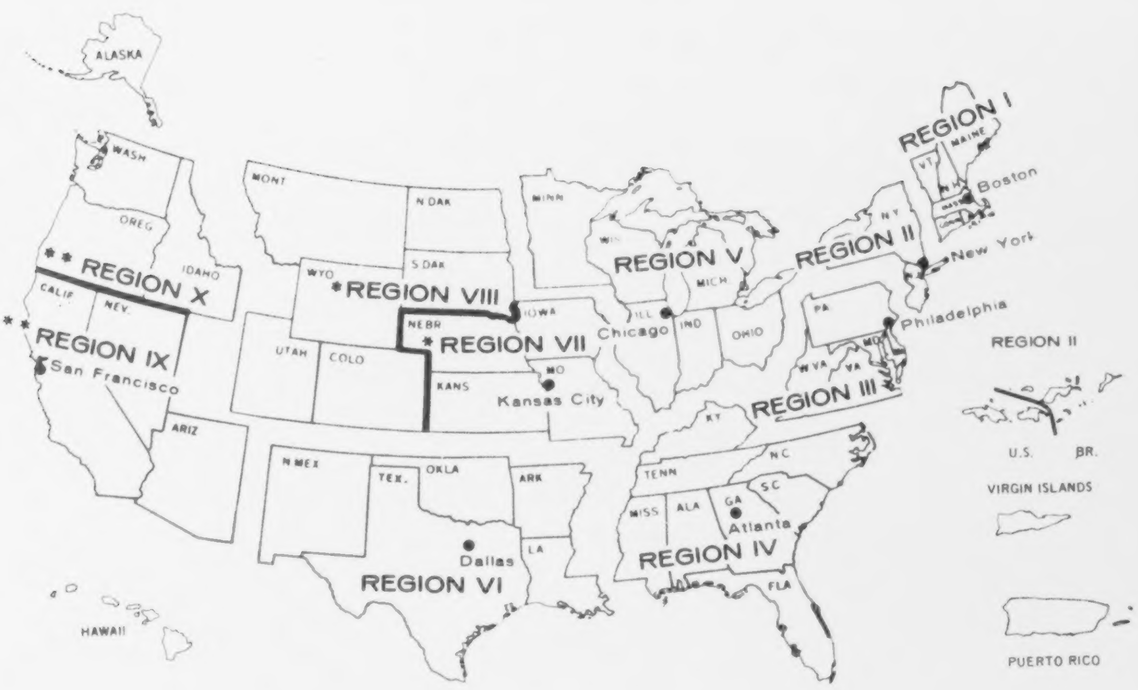
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** REGION X
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REGION IV
REGION III
REGION II
REGION I
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